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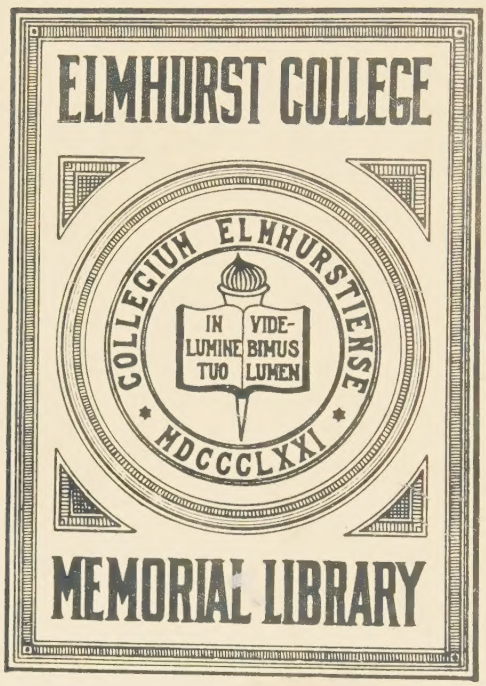

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Exchanges and other contributions to the Bureau should be addressed,

The DIRECTOR,
Bureau of American Ethnology,
Washington, D. C.,
U. S. A.

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THIRTEENTH ANNUAL REPORT

OF THE

BUREAU OF ETHNOLOGY

TO THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

1891-'92

BY

J. W. POWELL
DIRECTOR

WASHINGTON
GOVERNMENT PRINTING OFFICE
1896

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LETTER OF TRANSMITTAL

SMITHSONIAN INSTITUTION, BUREAU OF ETHNOLOGY,
Washington, D. C., July 1, 1892.

SIR: I have the honor to submit my Thirteenth Annual Report as Director of the Bureau of Ethnology.

The first part consists of an explanation of the organization and operations of the Bureau; the second part consists of a series of papers, prepared chiefly by assistants, which illustrate the methods and results of the work of the Bureau.

It is a pleasure to express appreciation of your unfailing support in the work intrusted to me.

I am, with respect, your obedient servant,

J. W. Powell

Director.

Honorable S. P. LANGLEY,
Secretary of the Smithsonian Institution.

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REPORT OF THE DIRECTOR

THIRTEENTH ANNUAL REPORT

OF THE

BUREAU OF ETHNOLOGY

By J. W. Powell, Director

INTRODUCTION

Ethnologic researches among the American Indians were continued during the fiscal year 1891–92, in accordance with acts of Congress.

When the Bureau was instituted in 1879, the aboriginal population of North America was already greatly restricted in territory and considerably reduced in number, and the territorial restriction was progressing more rapidly than ever before with the extension of white settlement, especially over the western and northern portions of the continent. At the same time the Indians were undergoing acculturation more rapidly than ever before, by reason of frequent contact with white men in nearly all parts of their aboriginal domain. The urgent need of researches concerning the characteristics and relations of the native races, emphasized by the rapidity with which they were being restricted and modified, was recognized by students and statesmen; this recognition led to the institution of the Bureau.

When the Bureau of Ethnology was organized, under authority of law, a plan of operation was formulated in accordance with what were deemed the most urgent needs. For two or three centuries explorers and students had observed and recorded, with pen and brush, the physical characteristics and the daily habits and customs of the American aborigines,

thereby producing a considerable library pertaining to the native races; and it was thought needless to compete with casual observers and extend the superficial and desultory observation such as is alone expedient under the ordinary conditions of exploration. Again, another Federal bureau was charged with the supervision of the current affairs of the Indians, its duties including the record of the lands allotted to, and claimed or conveyed by, the several tribes; it was accordingly deemed inexpedient to give attention primarily to the modern habitat of the tribes. At the same time, a number of students and scientific societies, especially in the eastern part of the continent, were giving attention to the relics of the red men distributed over the country in the form of stone and copper implements, weapons, and ornaments, as well as in the form of earthworks and graves; but since these relics were relatively imperishable and already under investigation, it seemed the less desirable that the energies of the new bureau should be expended in examining them. A still weightier consideration in determining the direction of research was found in the fact that many of the observations of explorers and other students of the Indians suggested, sometimes faintly, sometimes more clearly, but always more or less vaguely, the existence of a system or systems of organization among the Indians, differing widely from the customary organizations of white peoples; and it was thought desirable to investigate this obscure characteristic of the aborigines as thoroughly as possible. Moreover, a wide dissimilarity in language had been brought to light; and since the earlier researches in this and other countries indicated that tribes and peoples may be classified by language more satisfactorily than in any other way, it was thought important to extend linguistic researches energetically. Influenced by this consideration, the Director planned for a series of researches concerning the relations of the native tribes, as expressed in language and organization.

As the researches progressed, the original plan was modified from time to time, whenever the terms of law or increasing knowledge required. Conformably to a legal provision, the investigation of the prehistoric mounds was undertaken; and

for several years surveys and examinations of the aboriginal earthworks of eastern United States were carried forward, and reports thereon were published. A necessary collateral line of research, without which the full significance of the ancient earthworks could not be ascertained, related to the implements and utensils of the mound-builders, and the investigation was so expanded as to cover this subject; then it was found that the study of implements and utensils involved study of the art products and finally of the industrial arts of the builders, while the interpretation of the mortuary works involved extended researches concerning mortuary articles and customs in general; and in this way the researches were still more broadly expanded. Meantime, the linguistic researches were extended toward the fundamental elements of the art of expression. Among civilized peoples thought is expressed by vocables which are more or less purely arbitrary and so fully differentiated as to be essentially denotive, and ideas are recorded by means of characters which are almost wholly arbitrary or denotive; and to such degree has the mechanism of expression been developed that the oral and visual elements of expression are interwoven with thought so completely that most men think in these denotive symbols, whereby thought is simplified and made easy. Among primitive peoples this denotive symbolism is not developed, and in lieu thereof an extensive and cumbrous system of connotive or associative symbols is employed. This primitive system of expression represents in a general way the prescriptorial stage of human development. When the primitive peoples using such a prescriptorial system of symbols possess a definite social organization, this type of symbolism, like the higher type, becomes interwoven with thought in curious and persistent fashion, so that the primitive man thinks in a series of symbols which seem incongruous, extravagant, even bizarre, to the civilized thinker; and therein lies the chief difference between primitive and civilized modes of thought—a difference so profound that few civilized men ever comprehend the mental workings of the uncivilized man, while it is doubtful whether any uncivilized man ever comprehends the mentation

of his cultured brother. Thus, to the primitive thinker there is an association between directions, or points of the compass, and colors, and so directions and colors have become synonymous in his understanding; then directions and colors are habitually enumerated in a certain order, and thus the smaller numerals are added to the body of synonyms. Again, since it is important that every man, woman, and child shall always remember the connotive symbolism, many primitive peoples arrange themselves in a definite order when sitting about the camp fire in the family group, and in this way relative positions of individuals become associated with directions, colors, and numerals, and practically synonymous therewith. The associative symbolism does not stop here, but indeed goes much farther. Among some primitive peoples, individual names are applied connotively in such manner as to indicate order or rank, which is synonymous with position in the camping group; and among many peoples tradition is crystallized and preserved from generation to generation by means of a wide-reaching connotive association in which direction, color, number, and names all play important parts. In many instances organs of the body enter into the system; and wheresoever the connotive system is well developed, the traditions run back into myth and sometimes through myth into curiously elaborate cosmogony; and the myth and cosmogony are perpetuated by ceremonials in which direction, color, number, etc, perform essential roles. These are but a few of the ways in which the prescriptorial symbolism is employed; they serve only to indicate its fundamental and far-reaching character and the influence of the system on the primitive mind. By means of this symbolism, the social organization, the traditions, the myths, the ceremonials, the language, the industrial arts, and indeed all of the activities of the American Indians are interwoven to the extent that no class of activities can be studied thoroughly without careful study of other activities.

As these far-reaching relations of the arts of expression were brought out through the early researches of the Bureau, the organization and plan were modified as seemed necessary.

Since the complex relations of the modes of expression culminate and are expressed in oral language, and can be interpreted only through this medium, special attention was given to linguistic researches. These researches were in part direct, and it has been found thereby that language indicates the relations of tribes and families more clearly than other criteria, while at the same time the studies throw much light on the interesting subject of the evolution of language; and in part the linguistic researches have been pursued as a means to the end of gaining insight into the social organization, philosophy, and religion of the native tribes. Thus the problems of American ethnology, seemingly simple at the outset, have been found highly complex, and many lines of investigation have been opened.

With the increase of knowledge concerning the different lines of research, the labors of the Bureau have increased in some measure, though it has always been found necessary, by reason of financial limitations, to confine attention to those branches of the work that promised to yield the largest results with the least expenditure of time and money.

In accordance with the original plan of operations, special topics are assigned to individual collaborators. In general, each collaborator makes researches in the field during a part of each year, spending the remaining months in the office in the elaboration of the field material, either for publication or for record in such manner as to facilitate future studies and comparisons. Thus the assignment of the work is primarily topical, and the field researches form the basis for office work by the field students and their collaborators.

Since the institution of the Bureau, it has been the policy to convey to, and obtain from, intelligent observers all possible information concerning the Indians, and under this policy a wide correspondence has grown up. Most of that portion of the edition of its publications allotted to the Bureau for distribution is conveyed directly to ethnologic and archeologic students who have communicated valuable linguistic and other notes, which have been utilized by the Director and the collaborators in their researches. It is a pleasure to acknowledge

indebtedness to the many correspondents who have enriched ethnology by their zeal in the collection of information and by their liberality in conveying it to the Bureau for the public good.

FIELD OPERATIONS

The field operations during the year just closed comprised (1) archeologic researches and (2) general field studies, the latter being directed chiefly to mythology, technology, and linguistics. The archeologic work was conducted by Mr W. H. Holmes and his collaborators. The general field studies were carried forward by Mr H. W. Henshaw, Mr Albert S. Gatschet, Mr J. Owen Dorsey, Mr James Mooney, Dr W. J. Hoffman, and Mrs Matilda Coxe Stevenson.

ARCHEOLOGIC FIELD WORK

In the conduct of the archeologic researches Mr W. H. Holmes had the assistance of Messrs Cosmos Mindeleff, Gerard Fowke, and William Dinwiddie. Dr Cyrus Thomas, with the assistance of Mr F. W. Wright and Mr Frank Hamilton Cushing, also contributed to this branch of the work.

The survey begun in the tide-water regions of Maryland and Virginia in the spring of 1891 was continued throughout the present year. Careful attention was given to the examination and mapping of the shell deposits of the lower Potomac and Chesapeake bay, and many of the historic village sites visited by John Smith and his associates were identified and examined. The remains on these sites are identical with those of the many other village sites of the region. Mr Holmes studied the archeology of South, West, and Rhode rivers and of the shores of the bay above and below Annapolis. The middle Patuxent was visited, and the site of the ancient village of Mattpament was identified and examined. The valley of the Rappahannock in the vicinity of Fredericksburg, and the neighboring valleys of a number of the western tributaries of the Potomac received attention. Ancient soapstone quarries, one in Fairfax county, Virginia, and three in Montgomery county, and one in Howard county, Maryland, were studied, and collections of the quarry

rejects and implements used in quarrying and cutting the stone were obtained.

In July Mr Holmes made a trip to Ohio to assist in the resurvey of several geometric earthworks at Newark and near Chillicothe. A visit was made to the great flint quarries in Licking county, between Newark and Zanesville. This well-known quarry is one of the most extraordinary pieces of aboriginal work in the country, and the evidence of pitting and trenching, and of the removal and working up of great bodies of the flint, are visible on all sides, the work having extended over many square miles. Numerous hammerstones and large bodies of the refuse of manufacture are seen. The chief product of the work on the site here as elsewhere was a thin blade, the blank from which various implements were to be specialized. The countless handsomely shaped and beautifully tinted arrowheads, spear points, and knives scattered over Ohio and the neighboring states are derived chiefly from this site.

When the work of resurveying the earthworks at Newark and Chillicothe was finished, Mr Holmes made a journey into Indian Territory to examine an ancient quarry formerly supposed to be a Spanish silver mine. It was reported by Mr Walter P. Jenney, of the United States Geological Survey, that this was really an Indian flint quarry, and the visit of Mr Holmes confirmed this conclusion. Seven miles northwest of Seneca, Missouri, and 2 or 3 miles west of the Indian Territory line, there are numerous outcrops of massive whitish chert, and in places this rock has been extensively worked for the purpose of securing flakable material for the manufacture of implements. The pits and trenches cover an area of about 10 acres. They are neither so deep nor so numerous as the Flint Ridge quarries. The product of this quarry was also the leaf-shape blades of the usual type, the size being greater than in the other similar quarries of the country by reason of the massive and flawless character of the stone.

In May, 1892, Mr Holmes examined a number of extensive quarries of novaculite in Arkansas, one of which had been visited during the previous year. A great quarry situated on the summit of a long mountain ridge at the head of Cove

creek is the most extensive yet discovered in this country. The ancient excavations extend along the crest of the ridge for several miles. The largest pits are still 25 feet deep and upward of 100 feet in diameter. The product of this quarry was also leaf-shape blades of the type obtained from the other quarries, and closely analogous in size, shape, and appearance to those of Flint Ridge, Ohio. Mr Holmes next passed northward into Stone county, Missouri, to visit a very large cave situated about 20 miles southeast of Helena, the county seat. Neither human remains nor works of native art were found within the cave. The manufacture of chert implements had been carried on extensively in the surrounding region. From Stone county he went to southwestern Minnesota, and spent ten days in the study of the red pipestone quarry so famous in the history of the Coteau des Prairies. Evidence of the prehistoric operation of this quarry was found in the series of ancient pits extending across the prairie for nearly a mile in a narrow belt and following the outcrop of the thin layer of pipestone.

The ancient copper mines of Isle Royale, Lake Superior, were next visited and mapped, and extensive collections of stone hammers were obtained from the numerous pits and trenches.

Mr Holmes afterward proceeded to Little Falls, Minnesota, to examine the locality from which certain flaked quartz objects, supposed to be of paleolithic age, had been obtained. It was found that these bits of quartz were the refuse of the manufacture of blades of quartz by the aborigines, and at a period of time not necessarily more remote than the period of quarry working already described.

Mr Cosmos Mindeleff closed the field work on Rio Verde, Arizona, early in July, 1891. An account of this survey was given in the last annual report, and the results are incorporated in this report. He returned to Washington during the month, and was engaged for the remainder of the fiscal year in office work.

Mr Gerard Fowke completed the exploration of James river and its northern tributaries, making interesting discoveries in

Botetourt, Bath, Alleghany, and Highland counties. He then began an examination of the prehistoric remains of Shenandoah valley, remaining in the field until December. Later he examined the islands and coast between Savannah and St. Johns rivers, locating mounds and shell heaps. In the spring he resumed work in Shenandoah valley, making a careful and thorough investigation of every county. The results show that this region was not the seat of permanent occupancy by the aborigines, though it seems to have been a place of resort for hunters in large numbers.

Mr William Dinwiddie was engaged during the year in mapping and examining the shell banks and other aboriginal remains of the Potomac-Chesapeake region.

As Dr Cyrus Thomas was engaged most of the time during the year in necessary office work, his field work was limited. Finding more accurate information desirable in reference to certain ancient works in Vanderburg county, Indiana, he engaged Mr F. W. Wright to make a careful survey and measurement of them. As the result showed that they were of unusual importance on account of their peculiar character as compared with other ancient works of the same section, Dr Thomas found it necessary to make a personal examination of them. During the same trip he examined certain important mounds in Illinois, among which was the noted "Cahokia" or "Monk's Mound," of Madison county. His object in this case was to ascertain the present condition of this remarkable monument, and to investigate certain other points in relation to which satisfactory conclusions could be reached only by personal inspection.

He also made during the summer another examination of the Newark works and Fort Ancient, in Ohio, in order to settle some points which previous reports had overlooked. At his suggestion the Director had a resurvey made, under the direction of Mr Henry Gannett, of the four most noted circles of the Ohio works, the planetable being used to show their exact form as they at present appear.

Mr F. H. Cushing, during the summer and autumn months of 1891, made some examinations on the shore of Lake Erie,

near Buffalo, and of Lake Ontario in Orleans county, New York, where he discovered pottery of the well-known net-impressed lacustrine or littoral type, and also, at the former point, some pits or slightly indurated cavities in the sand, which he considered to be connected with the manufacture of that pottery. By experiments made without the aid of modern appliances of any kind, he duplicated the ancient specimens found in the vicinity, and showed that these pits, lined with ordinary fishing nets, had actually been used simply and effectively for shaping pottery. He afterwards prepared an illustrated report giving the details on the subject.

GENERAL FIELD STUDIES

WORK OF MR H. W. HENSHAW

On May 14, 1892, Mr H. W. Henshaw proceeded to New Mexico and California for the purpose of collecting material for the tribal synonymy, and also with the view of collecting such linguistic information as to permit more trustworthy classification of certain southwestern tribes. He was also commissioned to make collections for the World's Columbian Exposition. He was able to make a considerable collection of objective material, which was arranged in the National Museum and conveyed to Chicago as a part of the exhibit of the Bureau of Ethnology. He also obtained a considerable body of linguistic and other data pertaining to the tribes of southern California; but unhappily his health became impaired, and, while he remained in the field until the close of the fiscal year, the results of his work were not so voluminous as anticipated.

WORK OF MRS M. C. STEVENSON

In August, 1891, Mrs Matilda Coxe Stevenson resumed her investigations into the mythology, religion, and sociology of the Zuñi Indians, making a careful study of the shrine worship which constitutes an important feature in the religion of those people. She added to the already valuable collection of photographs and sketches of their sanctuaries, made in previous

years by Mr James Stevenson, and by the aid of the war priest of Zuñi secured from the tribe some interesting objects.

Through the influence of the war priest, the priest of the Kâ-kâ, and theurgists of the "medicine societies," Mrs Stevenson was able to be present at Zuñi ceremonials almost continuously from the time of her arrival to her departure in March.

WORK OF DR W. J. HOFFMAN

Dr W. J. Hoffman proceeded early in August to the Menomini reservation in Wisconsin, in response to an invitation from the mitawok or chiefs of the Mitawit (or "Grand Medicine Society") of the Menomini Indians, to observe the ritualistic ceremonies and order of initiation of a new candidate for membership, for comparison with similar ceremonials of other Algonquian tribes. In addition to the mythologic material collected at this attendance, he also secured much valuable information relating to the primitive customs and usages of the Menomini for use in the preparation of a monograph on that people. Specimens of their workmanship were also collected.

As he had been appointed a special agent for making ethnologic collections for the exhibit to be made by the Bureau of Ethnology at the World's Columbian Exposition, he secured a collection of Menomini material, as well as a number of desired objects at White Earth reservation, Minnesota. In May, 1892, he visited the Crow agency in Montana, to procure a collection of articles illustrating the industries and workmanship of the Crow Indians. It was deemed specially desirable to obtain some of the elaborate clothing for which the tribe is remarkable. A unique series of articles was obtained, after which a visit was made to the isolated band of Ojibwa at Leech lake, Minnesota, to collect various specimens desired to complete the collection illustrating early Ojibwa history.

On his return, Dr Hoffman again stopped at the Menomini reservation to make final collections of ethnologic material and to complete his studies of the ritual and initiatory ceremonies of the Grand Medicine Society, a meeting of which body had been called for this special purpose. He returned to Washington in June, 1892.

WORK OF MR JAMES MOONEY

Mr James Mooney, during the field months of the fiscal year, continued making collections for an exhibit at the World's Columbian Exposition comprising objects to illustrate the daily life, arts, dress, and ceremonies of the Kiowa in the southeastern part of Indian Territory. That tribe was selected as continuing in its primitive condition more perfectly than any other which could be examined with profit. He succeeded in making a tribal collection which is practically complete, including almost every article in use among the Kiowa for domestic uses, and for war, ceremony, amusement, or dress. A number of photographs were also obtained. On his return in August this collection was labeled and arranged in cases ready for transportation to Chicago on the opening of the Exposition, and by the use of the photographs and costumes several groups of life-size figures were prepared to show characteristic scenes in Indian life.

In November he again set forth to obtain additional information relating to the ghost dance, especially among the principal tribes not before visited. After a short stay in Nebraska with the Omaha and Winnebago Indians, neither of whom, it was found, had taken any prominent part in the dance, he went to the Sioux villages at Pine Ridge agency, South Dakota, the chief seat of the late outbreak, where he collected a large number of songs of the dance and much miscellaneous information on the subject. From there he went to the Paiute in Nevada, among whom the messiah and originator of the ghost dance resides. Here he obtained the statement of the doctrine from the lips of the messiah himself, took his portrait (the only one ever taken), and obtained a number of dance songs in the Paiute language. He then returned to the Cheyenne and Arapaho Indians in Indian Territory, among whom he had begun the study of the dance, and obtained from them the original letter which the messiah had given them, containing the authentic statement of his doctrine and the manner in which they were to observe the ceremonial. He returned to Washington in February.

In May he again started out to gather additional ethnologic material, especially with regard to the Kiowa, and to obtain further collections for the World's Columbian Exposition. Going first among the Sioux, he proceeded next to the Shoshoni and northern Arapaho villages, in Wyoming, and then to the Kiowa country, in Indian Territory, where he was still working at the close of the fiscal year.

WORK OF MR J. OWEN DORSEY

Reverend J. Owen Dorsey, from January 14 to February 21, 1892, made a trip to Lecompte, Rapides parish, Louisiana, for the purpose of gaining information from the survivors of the Biloxi tribe. He found only one person, an aged woman, who spoke the language in its purity, and two others, a man and his wife (the latter the daughter of the old woman), whose dialect contains numerous modifications of the ancient language. From these three persons he obtained several myths and other texts in the Biloxi language, material for a Biloxi-English dictionary, local names, personal names, names of clans, kinship terms, list of flora and fauna with their Biloxi names, and grammatic notes. He filled many of the schedules of a copy of the second edition of "Powell's Introduction to the Study of Indian Languages" (English-Biloxi in this instance). He brought to Washington a few botanical specimens, for which he had gained the Biloxi names, in order to obtain their scientific names from the botanists of the Smithsonian Institution. He photographed three Biloxi men and two women, all who could be found. There were about seven other Biloxi residing in the pine forest 6 or 7 miles from Lecompte, but they would not be interviewed. The Biloxi language contains many words which resemble their equivalents in other Siouan languages, some being identical in sound with the corresponding words in Dakota, Winnebago, etc. The Biloxi has more classifiers than are found in the other languages of this family, and, while it uses adverbs and conjunctions, it often expresses a succession of actions by mere juxtaposition of two, three, or more verbs. In the paucity of modal prefixes it may be compared with the Hidatsa and Tutelo, and in the use of d^{dh} and

t^{th} it may be classed with the Kwapa and Hidatsa. The information now gained permits a tabular comparison of the Biloxi with the Hidatsa, Winnebago, Kataba, and Tutelo, those five being regarded as the archaic languages of the Siouan family.

WORK OF MR ALBERT S. GATSCHET

Mr Albert S. Gatschet, having met with little success in his previous attempt, in 1884, to study the Wichita language in the field, continued to watch for better opportunities. In 1892 he met twelve young men of that tribe in the Educational Home (branch of the Lincoln Institute) at Philadelphia, and selected four of the brightest of their number, who seemed to be the most promising through their advanced knowledge of English. With their help he gathered about three thousand terms of Wichita, which is a Caddoan dialect, also a large number of paradigms and sentences, and a few mythologic texts. A thorough interchangeability of the consonants makes the study peculiarly difficult.

Maria Antonia, a young Costa Rica woman residing in Philadelphia, was questioned concerning what she remembered of her native tongue, the Guatuso. About one hundred and twenty vocables were recorded as the result of the inquiry. Mr Gatschet's field work extended from the beginning of March to the beginning of June, 1892.

OFFICE RESEARCHES

The Director devoted some time to the revision and correction of a report on the "Indian Linguistic Families of America North of Mexico," as it passed through the press. In this work he was efficiently aided during the earlier part of the year by Mr H. W. Henshaw. Although not voluminous, this document comprises, in specialized form, one of the classes of data which the Bureau has been engaged in collecting since its institution; while a part of the information was obtained from both the earlier and the current literature of the subject, as well as from the voluminous correspondence of the Bureau. Although the copy was prepared with care, it was found desirable to reex-

amine the various sources of information and to incorporate the latest data obtained from correspondence and from recent publications, and the labor of revision was thereby materially enhanced. The memoir is printed in the Seventh Annual Report of the Bureau.

Mr H. W. Henshaw was largely occupied during the earlier part of the fiscal year in the general administrative work of the office. In addition to these duties, he was employed, up to the middle of May, in the preparation of the tribal synonymy, which has been described in previous reports. In this work Mr Henshaw had the assistance of Mr F. W. Hodge, who devoted particular attention to the Piman and Yuman linguistic stocks, as well as to the several stocks represented among the Pueblo Indians. Satisfactory progress was made in the accumulation of material for this work, which is recorded on cards in such manner as to be either available for publication at any time, or accessible for reference until the work is so far completed as to warrant printing. The cards are arranged in drawers in cases provided for the purpose. They are already of great and constantly increasing use, not only to the collaborators of the Bureau but to students of ethnologic and historical subjects from other governmental bureaus and departments. In connection with the administrative work, Mr Henshaw was occupied for some time in preparing the exhibit of the Bureau for the World's Columbian Exposition at Chicago.

Colonel Garrick Mallery, United States Army, was occupied chiefly in writing in final form a comprehensive paper on the "Picture Writing of the American Indians," which presents the result of several years of personal exploration and study of all accessible material on that subject. At the close of the year the manuscript and the drawings for the large number of necessary illustrations had been transmitted through the Secretary of the Smithsonian Institution to the Public Printer. Colonel Mallery was also, during the greater part of the year, charged with administrative duties and with the execution of a variety of special works under the instructions of the Director.

The office work of Mr W. H. Holmes consisted in the completion of papers on the pottery and shellwork of the aborigines of the United States. A third paper was written, on the

textile fabrics obtained from the mound region; and a fourth, on the stone implements of the tide-water country, was substantially completed. A fifth paper, on the general archeology of the region, was commenced.

At the commencement of the official year Dr Cyrus Thomas was engaged in examining and correcting the proof of his "Catalogue of Prehistoric Works East of the Rocky Mountains," which was published in the latter part of 1891 as a Bulletin of the Bureau. This examination involved in many cases the necessity of a reference to the authorities quoted.

Much of his time during the year was employed in writing the final pages of the report on the field work and explorations which for several years had been in his charge, and in adapting it to a change in the form and manner of its publication which had been made necessary. This involved the rewriting of many pages and a material condensation of the introductory portion relating to the distribution of types of mounds. It was completed by the close of the fiscal year and filed for publication, nearly all the illustrations having been drawn and prepared for engraving.

Dr Thomas devoted all his spare time to the study of the Maya codices and to the preparation of a report on the discoveries he made therein. One of these, which is deemed of much interest and importance, is that, when the Dresden codex, which is considered the most ancient of those known, was written, the year consisted of 365 days, and that the calendar was arranged precisely as it was found to be by the Spanish conquerors. His most important discovery, made during the closing days of the year, was the key to the signification of the hieroglyphic characters of the codices, by which it is probable that the inscriptions may ultimately be read. This discovery, which the tests so far applied appear to confirm, consists, first, in the evidence that the characters as a rule are phonetic, and, second, in ascertaining the signification of a sufficient number to form a basis for the interpretation of the rest. If this discovery proves to be what, from the evidence presented, it appears to be, it will be of incalculable importance to American archeology.

Early in the year the work of Mr Cosmos Mindeleff commenced in repairing and securing the preservation of the Casa Grande ruin. This work was ordered by act of Congress, and plans for its execution had been prepared by Mr Mindeleff while in Arizona during the previous year. These plans provided for the excavation of the interior of the ruin and underpinning of the walls with brick and cement, the use of tie-beams to hold the walls in place and render them more solid, the restoration of the lintels over door and window openings, and the filling of the cavities above the lintels with brick and cement. The work was completed in November, and was inspected and accepted. Although all that was deemed necessary to preserve the ruin could not be done with the appropriation provided, still it is believed that enough was done to preserve it in its present condition for many years. All the work done was directed to the preservation of the ruin, no attempt at restoration being made. In June, 1892, the President, in accordance with the authority vested in him by Congress, reserved from settlement twelve quarter sections about the ruin, comprising an area of about 480 acres. A number of specimens obtained during the excavation were shipped to Washington and deposited in the National Museum.

During a part of the year Mr Mindeleff was engaged in the preparation of a report on his field work of the previous year. This report, entitled "Aboriginal Remains in Verde valley, Arizona," was completed and appears in this volume. Aside from a comprehensive treatment of the ruins in the valley of the Verde the report contains the first illustrations published of ancient irrigating ditches, and the first comprehensive data, including illustrations, relating to cavate lodges. It is fully illustrated from photographs, plans, and surveys made by the author. Subsequently Mr Mindeleff commenced a scientific report on Casa Grande ruin, Arizona, which also appears elsewhere in this volume.

No new work was undertaken in the modeling room during the year, as the entire force was occupied in preparing duplicates of models previously executed for use at the World's Columbian Exposition and elsewhere. Six models, in addition to other material, were sent to Spain, to be exhibited at the

Historical Exposition at Madrid. The series comprised models of the Pueblo of Zuñi, New Mexico, the Pueblo of Walpi, Arizona, and Mummy Cave cliff ruin, Arizona, all of large size, together with three smaller models of ruins.

An indefinite leave of absence without pay was granted to Mr Frank Hamilton Cushing in December, 1886, in order that he might organize and conduct the important explorations in southern Arizona and the Zuñi country provided for by Mrs Mary Hemenway, of Boston. His successful prosecution of this work was suddenly interrupted in the spring of 1889 by a severe and prostrating illness, which disabled him until the summer of 1891. He was therefore unable to resume promised work on his older Zuñi material for the Bureau until August, 1891, when he began the preparation of a memoir on the Zuñi myths of creation and migration as related to the mythic drama-dance organization, or *Kâkâ*, of the Zuñis—the so-called Kachina ceremonials of the other southwestern Pueblo tribes. Mr Cushing's discoveries, as set forth in this essay, confirm and substantiate the opinion held by the Director that all primitive so-called dance ceremonials are essentially dramatic, and they go so far as to indicate also that all primitive ceremonials, of whatever nature, are essentially dramaturgic, thus making his contribution of general as well as of special significance.

In January, 1892, Mr Cushing again reported at Washington and was regularly engaged as an ethnologist of the Bureau on February 1, and he has since been occupied in elaborating his paper on the myths of the drama dances and on a study of manual concepts or the influence of primitive hand usages on mental development in the culture growth of mankind. The memoir on the former subject appears in this volume.

Mrs Stevenson returned from the field in March, 1892, and was employed for the remainder of the fiscal year in preparing her field notes for publication.

Mr Gerard Fowke was engaged during December and January in preparing a report of his season's work in archeology, arranging and classifying the specimens procured, and embodying in reports, previously prepared, the results of recent discoveries. His report is appended hereto.

The office work of Dr Hoffman consisted in arranging the material gathered during the preceding field season and in preparing for publication an account of the Midēwiwin, or so-called "Grand Medicine Society," of the Ojibwa Indians of White Earth, Minnesota. This work, which forms one of the papers accompanying the seventh annual report, embraces new material, and consists of the traditions of the Indian cosmogony and genesis of mankind, the "materia medica" of the shamans, and the ritual of initiation, together with the musical notation of the chants and songs used.

During the winter and spring months a delegation of Menomini Indians from Wisconsin visited Washington, and Dr Hoffman frequently conversed with them to obtain information explanatory of the less known practices of the Menomini ceremony of the Mitawit, or their "Grand Medicine Society," for the purpose of comparison with the ritual as observed by the Ojibwa. In addition a large mass of mythologic material was obtained, as well as texts in the Menomini language.

On returning from the field in August, 1891, Mr James Mooney spent about ten weeks in arranging his Kiowa collection for the World's Columbian Exposition, writing out a series of descriptive labels, and in copying all the more important documents relating to the "ghost dance" from the files of the Indian Office and the War Department. He then again went into the field, as above stated, returning to Washington in February, 1892. About three months were then occupied in arranging the material thus obtained and in writing the preliminary chapters of his report on the ghost dance. He also superintended the preparation, at the National Museum, of a number of groups of life-size figures to accompany the Kiowa collection at the World's Fair.

Reverend J. Owen Dorsey continued the arrangement of Kwapa texts with interlinear and free translations and critical notes. He revised the proof of "Omaha and Ponka Letters," a bulletin prepared from Ɂegiha texts collected by himself. He finished the collation of all the Tutelo words recorded by Dr Hale, Mr J. N. B. Hewitt, and himself, with the result that he had 775 words in the Tutelo-English dictionary. He

furnished a list of several hundred linguistic and sociologic questions to be used among Indian tribes. These questions were in addition to those contained in the second edition of the Introduction to the Study of Indian Languages, and were based on original investigations made by Mr Dorsey among the Siouan tribes He prepared for publication the following articles: Siouan Onomatopes (sound-roots), illustrated by charts; The Social Organization of Siouan Tribes, illustrated by figures consisting chiefly of material gained by himself from the Dakota tribes, the Omaha, Ponka, Kwapa, Osage, Kansa, Iowa, Oto, Missouri, Winnebago, and Tutelo; Nanibozhu in Siouan Mythology; Games of Teton Dakota Children (translated and arranged from the original Teton manuscript in the Bushotter collection of the Bureau of Ethnology). He also prepared a paper on Omaha Dwellings, Furniture, and Implements, which accompanies this report.

After his return from Louisiana Mr Dorsey devoted most of his time to the arrangement of the material collected in his Biloxi note-books. He prepared a Biloxi-English dictionary of 3,183 words on about 7,000 slips in alphabetic order. He arranged the Biloxi texts for publication, adding to the myths (with their interlinear and free English translations and critical notes) a list of several hundred Biloxi phrases. In his article on the Biloxi kinship system, he gave 53 kinship groups, of which number only 27 have their counterparts in the Dakota, Ɂegiha, and other Siouan languages of the Missouri valley. The elaboration of all the Biloxi material was not completed at the end of the fiscal year.

Mr Albert S. Gatschet assisted in augmenting and improving the data for the tribal synonymy, extracting material from a number of books and original reports especially referring to southern and southwestern Indians. His main work during the year was directed toward extracting and arranging some of the more extensive vocabularies made by him previously in the field. After completing the Tonkawe of Texas, he carded each word of the Shawano and Creek languages obtained by him, copied the historical and legendary texts of both, and extracted the lexic and grammatic elements from them to serve

as the groundwork for future grammars. The known records of the Virginia or Powhatan languages were also made accessible by carding the terms.

During the fiscal year Mr J. N. B. Hewitt was a part of the time engaged in careful study of the grammatic forms of the Iroquoian languages, especially in ascertaining the number and order in which the affixes may be used with one and the same stem or base He was also engaged in translating, extracting, and transferring to cards from the "Découvertes et Établissements des Français dans l'Amérique septentrionale," by Pierre Margry, matter relating to the manners, customs, beliefs, rites, ceremonies, and history of the Iroquois. This matter is now placed on about 20,000 cards. He continued his work on the Tuskarora dictionary and directed attention to developing the full number of ordinary sentences in which every generic noun may be employed for the purpose of establishing a measure of the capacity of the vocabulary for the expression of thought.

Mr James C. Pilling continued his bibliographic work throughout the year, giving special attention to the Athapascan family. Work on this family was begun early in the fiscal year; on October 13 the manuscript was sent to the printer, and at the close of the year all but a few pages of the final proofs were read. The bibliography of the Athapascan languages forms a bulletin of xiii + 125 pages. While this volume was being put in type Mr Pilling began the collection of material for other bibliographies relating to the languages of the northwestern coast of America—the Chinookan, Salishan, and Wakashan—and satisfactory progress has been made. During the month of May, 1892, Mr Pilling made a brief visit to libraries in Boston and Cambridge in connection with the compilation of material relating to these northwestern languages.

Mr De Lancey W. Gill continued in charge of the work of preparing and editing the illustrations for the publications of the Bureau.

The total number of illustrations prepared during the year was 980. These drawings may be classified as follows:

Landscapes	6
Maps	6
Objects	300
Diagrams	31
Miscellaneous	637

The number of illustration proofs handled during the year was as follows: Eighth Annual Report, 308; Ninth Annual Report, 459. In addition, 678 illustrations for the Tenth Annual Report were transmitted to the Public Printer.

The photographic laboratory remains under the able management of Mr J. K. Hillers. A small but valuable collection of portraits of North American Indians was secured by him during the year from sittings; twenty-six negatives were obtained. The following table shows the size and number of photographic prints made:

20 by 24	45
11 by 14	274
8 by 10	546
5 by 8	875
4 by 5	1,187

PUBLICATIONS

The publications issued during the year are as follows:

(1) "Seventh Annual Report of the Bureau of Ethnology to the Secretary of the Smithsonian Institution, 1885–86, by J. W. Powell, Director." This report contains an introductory report by the Director, 27 pages, with accompanying papers, as follows: "Indian Linguistic Families of America north of Mexico," by J. W. Powell; "The Midēwiwin or 'Grand Medicine Society' of the Ojibwa," by W. J. Hoffman; "The Sacred Formulas of the Cherokees," by James Mooney. The report forms a royal octavo volume of lxi+409 pages, illustrated with 39 figures and 27 plates, one of which is a folding plate in a pocket at the end of the volume.

(2) "Contributions to North American Ethnology, vol. II, part II." This part contains the Klamath-English and English-Klamath Dictionary, by Albert Samuel Gatschet, and concludes his work relating to "The Klamath Indians of Southwestern Oregon." The volume is a quarto of 711 pages.

(3) "Contributions to North American Ethnology, vol. VI," containing the following papers by James Owen Dorsey: "The ɸegiha Language, part I, Myths, Stories, and Letters," and "The ɸegiha Language, part II, Additional Myths, Stories, and Letters." The report forms a quarto volume of xviii+794 pages.

(4) "Contributions to North American Ethnology, vol. VII, "A Dakota-English Dictionary, by Stephen Return Riggs, edited by James Owen Dorsey." This is a quarto volume of x+665 pages.

(5) Bulletin of the Bureau of Ethnology, "Omaha and Ponka Letters," by James Owen Dorsey. This work forms an octavo volume of 127 pages.

(6) Bulletin of the Bureau of Ethnology, "Catalogue of Prehistoric Works East of the Rocky Mountains," by Cyrus Thomas. This document is an octavo volume of 246 pages, with 17 maps.

(7) Bulletin of the Bureau of Ethnology, "Bibliography of the Algonquian Languages," by James Constantine Pilling. This work forms an octavo volume of 614 pages, with 82 plates of facsimiles of title-pages of rare works.

FINANCIAL STATEMENT

Appropriation by Congress for the fiscal year ending June 30, 1892, "For continuing ethnological researches among the American Indians under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees" (Sundry civil act, approved March 3, 1891		$50,000.00	
Balance July 1, 1891, as per last annual report		12,774.24	
			$62,774.24
Salaries or compensation		36,560.33	
Traveling expenses	$3,660.05		
Transportation	963.69		
Field subsistence	719.20		
Field expenses	1,675.25		
Field material	166.19		
Freight	380.55		
Supplies	1,867.98		
Stationery	80.38		
Office furniture	138.25		
Publications	566.63		
Drawings	908.77		
Laboratory supplies	27.80		
Repairs	51.11		
		11,205.85	
			47,766.18
Balance July 1, 1892			15,008.06

CHARACTERIZATION OF ACCOMPANYING PAPERS

SUBJECTS TREATED

Six special treatises are appended to, and form the body of, this report. The first is an illustrated paper on the textile art of the aborigines of eastern United States; it comprises descriptions and illustrations of textile art products preserved from the prehistoric past in various ways, and the relics are interpreted by means of the records of explorers and pioneers. The second paper is a synoptical description of the stone art of the native races, also of eastern United States, as exemplified in the collections of the Bureau of Ethnology; this article, too, being profusely illustrated. The third treatise pertains to the chiefly prehistoric aboriginal works of the Verde valley, Arizona. It elucidates clearly, by means of maps, plans, and pictures, as well as by verbal statement, the mode of life of the aborigines of the far southwest, while yet they remained free from accultural influences. To it the fourth paper is closely related in subject, though distinct in the sources of information. It is a description of the dwellings, furniture, and implements of one of the tribes of the northern plains, based on direct observations of the evanescent structures produced by the wandering tribesmen. The fifth paper comprises a detailed and illustrated account of the prehistoric "Great House" (Casa Grande), which was already ruined when Coronado traversed the arid plains of the southwest in 1540, and which has been deemed by statesmen of such importance as a relic of the past that steps have been taken to insure its preservation. The sixth treatise is a part of the rich body of tradition preserved among the Zuñi Indians, translated almost literally into the English, with a brief introduction explaining the bearings of the singularly picturesque cosmogony of this tribe.

Considered geographically, two of the papers treat of eastern United States, one of the northern-central portion of the country, and three of the arid region of the southwest, all finding their subjects within the national domain. Classified

topically, four of the papers are contributions to archeology or the prehistoric condition of the native races, while one pertains to the customs and another to the beliefs of the aboriginal tribes; the preponderance of the archeologic material being due partly to the fact that one of the branches of research pertaining to this subject is just terminating. Collectively, the papers cover a considerable part of the field of research which it is the province of the Bureau to carry on; and while, with the exception perhaps of the report on Casa Grande ruin, none of them can be regarded as exhaustive monographs, several are of such completeness as to represent fairly, and indeed fully, the most advanced knowledge concerning their subjects.

PREHISTORIC TEXTILE ART OF EASTERN UNITED STATES

In 1881 the law under which the Bureau of Ethnology was organized was modified by the addition of a specific provision that a part of the appropriation should "be expended in continuing archeological investigation relating to mound-builders and prehistoric mounds." Conformably to this provision, a survey of the prehistoric mounds and other earthworks scattered over the Mississippi valley and eastern United States was at once undertaken. At that time the mounds represented a serious problem of American archeology, most students inclining to the opinion that they were constructed by a race anterior to, and more highly cultured than, the Indians found in the same districts by explorers. Accordingly the surveys and other researches were planned and conducted in such manner as to throw light on the much-discussed question, Who were the mound-builders? To this end the studies were made comparative; the mounds themselves were compared from locality to locality and from district to district, throughout the section of the country in which they occur; and they were compared, also, with tumuli, cairns, pyramids, and other works of earth and stone in different countries. This comparison proved suggestive but not conclusive; it indicated a close relationship among the American mounds, and a more remote relationship to the earthworks of other countries. In order to render the

conclusion more definite, the examination was extended in various directions. The mounds were excavated and their contents scrutinized; the relics found therein were, like the mounds themselves, compared from locality to locality and from district to district, and also with the relics from foreign earthworks; then the osseous remains and artificial relics of the mounds were compared with the skeletons and art products of the historical period; and it was eventually found that the mound relics are in every respect essentially similar to those of the Indian tribes. Thus, after some years of patient research, extending over a large section of the country and embracing many thousand mounds, the question as to the builders of these works was gradually set at rest—it was shown to the satisfaction of the ethnologists and archeologists engaged in the work, and of other students of the subject in this country and abroad, that the builders of the mounds were unquestionably the historical Indians and their ancestors.

The general results of this research have been set forth in a previous report; but the more special results of several of the collateral lines of study were excluded from that report by reason of the great volume of the material, and were reserved for other publications. One of these collateral lines of study which was found especially significant, as indicating relations between the mound-builders and the historical Indians, pertained to textile fabrics. This study was conducted by Mr W. H. Holmes; its results are incorporated in the first of the accompanying treatises.

In the excavation of the mounds, traces of textile fabrics were frequently found. Generally the perishable textile materials were so far decomposed that little could be learned of the processes of manufacture; but when the fabric was wrapped around, or otherwise juxtaposed with, implements and ornaments of copper, it was preserved by the cupric oxide, and under certain other conditions also the fabrics were so well preserved as to permit careful examination. Thus, as the excavations progressed, a considerable quantity of textile fabrics was brought to light and subjected to comparative study. Meantime, opportunities for the examination of prehistoric fab-

rics from caverns and rock shelters, in which textile material is sometimes preserved through the influence of niter, copperas, and other earthy salts, were utilized; and, as the material from such localities was brought to light, it was compared with the textiles recovered from the mounds. The comparison was then extended to the fabrics produced by the historical Indians, special attention being given to the fabrics found in use among the Indians by the earliest explorers. The comparisons indicated similarity in all essential respects. As stated by Mr Holmes, "There are among them [the coarse cloths of the mound-builders] some finer examples of weaving than those obtained from the caves and shelters of Tennessee and Kentucky, but there is nothing specifically different in material or methods of combination, and there is nothing whatever to suggest a higher stage of culture than that of the historical Indian" (page 35).

As the researches and comparisons were extended, the pottery of the mounds and that found in use among the aborigines came under examination. Skilled in the recognition of textiles, Mr Holmes soon found that such pottery frequently bears impressions of woven fabrics, and he devised a method of taking casts from the fabric-impressed pottery by which the character of the fabric was shown much more clearly than in the negative impression. A large number of fabrics from the mounds were thus restored, and they were compared with restorations from the pottery of the historical Indians and of the primitive peoples of other countries, as well as with the fabrics themselves. This comparison indicated that the fabrics impressed on the mound pottery, like those found intact in the mounds, are essentially similar to the fabrics produced by the red men found roaming the plains and woodlands of this country, and that "All tell the same story of a simple, primitive culture, hardly advanced beyond the grade separating the savage from the barbarous condition" (page 45).

There are two modes of comparison, occupying different planes: The first is the direct or analogic comparison in which the objects themselves are juxtaposed (in reality or ideally, with the aid of memory and picture) and their external charac-

ters identified or discriminated. This is the common mode of comparison, such as was employed in comparative anatomy during the last generation, and such as is always employed in the earlier stages of research. The second method is that of rational or homologic comparison, in which the objects compared are considered as assemblages of characters, each conveying a meaning; and when the objects are juxtaposed (really or ideally) the comparison is made, not between external features, but between the meanings of these features. This is the method pursued in comparative anatomy today, and pursued everywhere in the more advanced stages of scientific development. The first method yields an adventive classification which is often of great convenience and utility, but which does not necessarily express fundamental relations; the second method yields an essential classification in which fundamental relations are expressed—and it is found, as the meanings of characters are accurately interpreted, that the essential classification is an arrangement by sequence or genesis. Now ethnology, including archeology and other branches of the science of man, have hardly reached the more advanced stage of homologic comparison or genetic classification; but, in the researches of the Bureau of Ethnology, efforts have constantly been made to raise the science to the higher plane represented by genetic classification. To this consummation no collaborator has contributed more than Mr Holmes, who, in his studies of textiles, of pottery, and of stone art, has constantly sought to interpret the special features of objects, and in this way to ascertain modes and conditions of development.

By pursuing this method of research and after acquainting himself through study and actual imitation with manufacture processes, Mr Holmes has been able not only to compare the fabrics from the mounds, caves, and wigwams, but to compare the processes of manufacture; and he has thus placed himself in a position to speak with much greater confidence concerning the makers of these fabrics than it would be possible to do with any amount of material arranged by the adventive classification.

It may be noted that Mr Holmes is now engaged on elaborate studies of the stone and fictile arts of the aborigines, the results of which are designed for publication in other reports, and that these researches have been conducted in the same advanced way—i. e., by means of homologic comparison—and have yielded results in complete accord with those flowing from the study of the textiles.

STONE ART

In the course of the excavation of the mounds a large number of relics of various kinds were recovered; and these were carefully preserved and brought to the office of the Bureau for study and comparison, and were afterward placed in the United States National Museum. Partly because of extensive use, partly because of its imperishable nature, the prevailing material of these relics is stone. A large number of the stone implements, weapons, ornaments, etc, were collected from the mounds; and in many cases these stone articles were associated with skeletons or with mortuary vessels and cerements in such manner as to prove that they were habitually used by the builders of the mounds.

As the archeologic surveys progressed, many articles of stone were found in the fields, forests, and plains, on the surface of the ground, sometimes in the vicinity of, sometimes far removed from, the prehistoric mounds; others were obtained either directly from living Indians in different parts of the country, or from white men who had received them from Indians or who had at least a definite history of the articles connecting them with the native makers, and frequently the use of the articles acquired in this way was ascertained through direct observation or through circumstantial account. Many articles picked up at random on the surface or extracted from mounds by farmers and hunters or by skilled archeologists were also added to the collection.

On assembling the stone art products from the mounds, those picked up on the surface, and those obtained directly from the Indians, it was found that all are essentially alike. It is true that sometimes all of the objects found in a single

mound are of superior design and excellent finish, and indeed the relics found in the burial mounds are, on the average, finer than those found on the surface; but in most of the mounds articles of ordinary and even decidedly inferior workmanship are not uncommon. On making allowance for the selection exercised in connection with Indian burial customs, whereby the finest possessions of the deceased are most likely to be inhumed or destroyed, it became evident that the surface relics and the historical articles are alike in the grade of culture represented. This similarity in art products is one of the lines of evidence linking the mound-builders with the historical Indians.

One of the collaborators of the Bureau engaged in surveys and examinations of the mounds was Mr Gerard Fowke. To him the task of arranging and classifying the stone art products was intrusted. One of the results of his excellent work is the accompanying paper on stone art. In classifying the material Mr Fowke followed the usage of archeologists in this and other countries, arranging the objects in part by processes of manufacture, in part by form, and in part by function; and in every class the functions were ascertained by comparison with the observations of anthropologists throughout the world, as recorded in the literature of the subject.

As will be seen from the tables and illustrations incorporated in the paper, the body of material with which Mr Fowke had to deal, and on which his descriptions are directly based, was quite rich. Thus the grouping of the grooved stone axes is founded on more than 200 specimens; the descriptions of celts rest on over 600 polished and 400 chipped specimens, or more than 1,000 in all. Of even so rare a class of relics as the hematite celt there are nearly a score of specimens; of the bulky and elaborate implements known as spuds there are 10 good examples, and of the beautifully finished articles commonly designated plummets 26 are described; while of the laboriously carved wheel-shape gaming articles known as discoidal stones there were no fewer than 800 in the collection. Of the articles classed as ceremonial, including gorgets, banner stones, etc, nearly 200 are described in detail or by type.

Collectively, the battered or polished stone objects number several thousand, and the chipped stone articles are still more numerous. Two hundred and fifty of the specimens are illustrated by careful drawings, many of which show profiles or sections, as well as the faces of the articles.

Mr Fowke's paper forms an illustrated descriptive catalogue of the stone art products collected in connection with the mound surveys. It is believed that the paper will be found of great interest and value to the many archeologists and collectors of the country.

ABORIGINAL REMAINS IN VERDE VALLEY, ARIZONA

There is a large tract in southwestern United States characterized by arid climate, dearth of water, and scantiness of vegetation. Much of this tract is mountainous, portions are broad plateaus, and other portions are extensive lowlands relieved by scattered mountain peaks and ranges. Structurally it consists chiefly of extensive and thick formations of Mesozoic and Cenozoic age, often lying in horizontal sheets. Locally these formations are broken by faults and tilted in various directions, and sometimes they are crumpled and folded; and over considerable areas they are associated with, or overlain by, lavas and other igneous rocks.

During the later geologic ages, that portion of the tract comprising parts of Nevada, Utah, Colorado, and New Mexico, with all of Arizona and much of Sonora in the neighboring Republic of Mexico, has suffered a general tilting southwestward; and this tilting or warping of the earth-crust has materially affected the geography of the region. In the first place, the northeastern half of the tract was lifted into a vast plateau, and thereby the temperature was lowered and precipitation increased; by reason of the warping the streams flowing in southerly and westerly directions were stimulated, and through the increased precipitation they gained still further in power; and accordingly this portion of the tract was corraded into a labyrinth of canyons, among which the Grand Canyon of the Colorado is most notable. At the same time, the streams flowing in northerly and easterly directions were para-

lyzed by the diminishing declivity of their ways, and some of their valleys were converted into basins, while others were robbed by the transgression of the more active streams flowing southwestward. In the southwestern half of the tract the rainfall remained slight, and the feeble streams born of the rare storms spent their energy in carrying débris from the mountains into the valleys, whereby the area of desert plains was still further increased. To this series of movements many of the peculiarities of the region are due; excepting the Little Colorado (which has been affected by peculiar conditions) and its tributaries, the principal streams flow westward, southward, and southwestward; their waters gather in the mountains or northeastern plateaus, and they flow for a time through canyons which gradually diminish in depth as the streams approach tide level—for the mean slope of the surface is greater than the mean slope of the stream; and during the dry season and sometimes throughout the year the streams are smaller in the lower courses than in the upper regions—for the waters are drank by the thirsty soil and absorbed by the heated air. South of the Gila and all the way to Rio Yaqui, halfway down the Gulf of California, the parched land yields no water to the sea. In their upper reaches the streams corrade, in their lower courses they deposit the débris gathered toward their sources; they degrade above and aggrade below, and thereby the great geologic process of gradation is in this region completed without the aid of the sea, save as a source of vapor. So the southwestern part of the tract is a region of arid plains of aggradation, beneath which the Mesozoic and Cenozoic formations are largely buried; the northeastern part is a region of arid plateaus, in which these formations crop out over the surface and in rugged canyon walls; while the central portion is a broad zone, in which the later formations crop out in low plateaus and mesas, and in which the southwestward-flowing streams are often flanked by alluvial terraces and floodplains. These geographic conditions, originating in clearly defined geologic processes, have affected the habitability of the tract since men first appeared therein—indeed, to these conditions the peculiarities of southwestern aboriginal culture are to be ascribed in large measure.

The valley of Rio Verde (the "green river" of the Spaniards) is a typical section of the middle zone of the great arid tract. Its waters gather among great volcanic mesas by which the southwestward slope of the sedimentary formations is broken; they flow southward in gradually shallowing canyons, chiefly of the bedded sedimentary rocks, falling into Rio Salado (the salted river), whose waters are so largely evaporated as to leave the residue brackish, and thence into the Gila. When swollen by storms, the Verde builds floodplains or overflows the plains of previous storms, and on these plains and terraces the hardy vegetation of the subarid regions greedily seizes and persistently maintains a preemption; so that the valley winds through the barren mesas, gray, pink, or black in tint, as a verdant ribbon. By this verdure the Spanish conquerors were attracted more than three centuries ago; but long before their coming the native peoples gathered along the fruitful river-banks to alternately practice a primitive horticulture in the valley bottom and find refuge from predatory neighbors in the rugged valley sides.

Mr Cosmos Mindeleff (the younger of the two Mindeleff brothers, long associated in archeologic work) spent several months in making surveys of, and researches concerning, the ruined villages, lodges, and irrigating works, which remain as the sole record of the prehistoric population of Verde valley. He found a large number of ruins, of which many were so well preserved as to indicate not only the style of architecture but, in many cases, the purposes and customs of the builders. Through careful comparison of the ruins themselves, of the implements and utensils found in connection therewith, of the irrigation works, of the relation of the sites to natural features, etc, he has been able to restore at least the main lines of the picture representing this region during prehistoric times.

The principal villages were built of stones, sometimes rude, sometimes rough dressed. They were usually great clusters of houses, or of rooms united in a single structure. They were often located without regard to defense; but they were placed on or near broad stretches of tillable bottom land. The remains of irrigation works indicate that the artificial control of the waters was extensive and successful.

Mr Mindeleff concludes that the ruins of the lower Verde valley represent a comparatively late period in the history of the tribes living in pueblos. He infers also that the period of occupancy was not a long one. His estimate of the prehistoric population is notably moderate. His careful drawings and other illustrations of the ruins, based on careful surveys and measurements, will, it is believed, be found of great and permanent value.

OMAHA DWELLINGS, FURNITURE, AND IMPLEMENTS

The northern plains of central United States are in many ways antithetic to the arid southwest; the rainfall is considerable, and fairly distributed throughout the year; the waterways are shallow, so that the flowing and ground waters are accessible to animals and within easy reach of the roots of plants; and a fairly luxuriant flora and rich fauna have long occupied the region. At an unknown yet probably not remote period, measured in years, and well within the recent time of geology, the bison spread over the plains, and by reason of exceptionally favorable conditions soon became the dominant animal form of the region, pushing far into the mountains on the west and still farther into the woodlands on the east. The development of living things is a succession of contests against enemies or inimical conditions, and a dominant form, animal or vegetal, soon comes to be beset on all sides by enemies, and frequently the development of the enemies follows hard upon the development of the dominant organisms; but the American bison seems to have come up with such rapidity as to outstrip the development of natural enemies; and the growth of the species chanced to be so related to the aboriginal occupation that it was first controlled and afterward checked by human agency. While the buffalo and the plains Indians were contemporaries, each influenced the other in some measure; and on the human associate, at least, the influence was potent. Some students have opined that, by reason of the extension of the buffalo into the cis-Mississippi woodlands, the Indians of the interior were transformed

from farmers to hunters. Whether or not this be true, it is certain that the plains Indians depended largely on the buffalo for subsistence, as well as for clothing and shelter, when first seen by white men. Thus their industries, which, like those of all primitive peoples, were adjusted directly to their conditions, were controlled largely by the presence of the buffalo. After the introduction of the horse, the Indians were able more effectively than before to capture their sluggish and naturally peaceful associates, and their industries came to be still more profoundly affected by the proximity and wealth of this source of food, clothing, and habitations.

It was in the closing episodes of this stage in the history of the plains Indians that the Reverend James Owen Dorsey came in contact with the Omaha tribe, first as a missionary and later as a scientific collaborator of the Bureau of Ethnology. The Indians were still in the prescriptorial stage of culture; and thus some of their dwellings, in their arrangement, design, and ornamentation; their ceremonials, costumery, and furniture, and some of their weapons and implements, were of special interest. As Mr Dorsey observes, there were no sacred rites connected with lodge-building or tent-making at the time of examination; yet the symbolism elsewhere or othertime connected with such ceremonials persisted.

The more permanent lodges of the Omaha were of earth or else of bark or mats; but the skin tents were common and characteristic. In a general way the tents of the northern plains Indians are well known through the descriptions and illustrations of many explorers; but few observers have noted the minor features of construction with care, and Mr Dorsey's descriptions are for this reason of special interest. So also the descriptions of the calumet or ceremonial pipe, and of the musical instruments, etc, are of value because of the painstaking study given to minor details as well as to general features.

CASA GRANDE RUIN

The territory of the pueblos and cliff houses merges southwestward into the land of low-lying plains, composed chiefly of alluvial deposits, though isolated buttes and narrow yet

rugged ranges rise from its surface. The land of the canyons and the land of alluvial plains belong to the same province, and their characteristics, as already set forth, are due to a general southwestward tilting. In the canyons the aboriginal habitations and temples were of stone, which was everywhere abundant; in the plains the structures were of earthen grout or cajon—a puddled mass of soil, perhaps mixed with pebbles, molded into walls in successive layers, each allowed to dry in the sun before the next layer was added; sometimes this type of structure was modified by the incorporation of upright or horizontal beams or poles, and sometimes the cajon was combined with a sort of wattled structure composed of stems and ribs of cacti, etc; but in general cajon was an important element in the construction of the more permanent structures of the lowland.

A considerable part of current knowledge concerning the construction of the larger buildings of the plain springs from studies of the Casa Grande (the "Great House" of Spanish explorers), not far from the present town of Florence, Arizona. This structure was discovered, already in ruins, in 1694, by Padre Kino; and it has ever since been a subject of note by explorers and historians. Thus its history is exceptionally extended and complete. By reason of the early discovery and its condition when first seen by white men, it is known that Casa Grande is a strictly aboriginal structure; and archeologic researches in this country and Mexico afford grounds for considering it a typical structure for its times and for the natives of the southwestern region. Many other structures were mentioned or described by the Spanish explorers, but the impressions of these explorers were tinctured by previous experiences in an inhospitable region, and their descriptions were tinged by the romantic ideas of the age. Moreover, nearly all of these structures disappeared long ago—indeed, with the exception of Casa Grande ruin, there is hardly a structure left by which the early accounts of Spanish explorers in North America can be checked and interpreted. Casa Grande is therefore a relic of exceptional importance and of essentially unique character.

Several years ago Casa Grande ruin was brought into general notice throughout the United States in consequence of southwestern explorations; and in 1889, in response to a petition from several illustrious Americans, the Congress of the United States, at the instance of Senator Hoar of Massachusetts, made an appropriation of $2,000 for the purpose of undertaking the preservation of this ruin. This appropriation was expended in works urgently required to prevent the falling of the walls and final destruction of the ruin; they included metal stays for the walls, with brickwork for the support and protection of the walls at their bases. Subsequently an area of about 480 acres, including the ruin, was reserved from settlement by Executive order. A custodian was also appointed, and has since been continued.

The accompanying description of this notable ruin, by Mr Cosmos Mindeleff, is based on examinations and surveys made before the preservative works were commenced. The memoir accordingly presents an accurate picture of the ruin in the condition to which it was brought by the destructive agencies of nature and the relatively slight injury by vandals. The history of the operations for the preservation of the ruin, with suitable illustrations, is reserved for a future report.

OUTLINES OF ZUÑI CREATION MYTHS

Under primitive conditions of life, the habits and customs of people directly reflect the environment by which they are surrounded, and these habits and customs in turn shape thought. In this way there has been developed among each primitive people of the earth a series of opinions concerning the relations of the things about them among each other and to mankind; and sometimes such a group of opinions is elaborated into a system of philosophy. Now, all primitive philosophies are more or less mythic and unreal—indeed, the whole course of intellectual development among mankind has been one of constant elimination of unreality. Thus the primitive philosopy is in greater or less degree a mythology; and the myths are intimately interwoven with history and tradition in such manner

that each primitive people has a more or less definite and detailed cosmogony.

In view of the mode of development of the primitive cosmogony, it is not surprising to find an intimate connection between the story of the earth, sun, and stars and the immediate surroundings of the people among whom the cosmogony was developed. Thus the myths of a people who have lived long by the sea relate to water monsters, and perhaps to great inundations, as well as to other phenomena with which they are acquainted; the myths of primitive mountaineers relate to ancient animals, akin to those roaming the mountain sides but much larger and more sagacious, and also to great torrents in the gorges, to thunder and lightning, perhaps to caverns, and to other phenomena of their experience; the myths of desert tribes relate to springs or streams, to plants that afford sustenance, perhaps to great storms, and to other phenomena of their peculiar experience. In this way the myths of the tribes are connected with natural provinces of the earth inhabited by tribes, and as these provinces intergrade, so the myths intergrade. Moreover, since the experiences of a people in a given province on one continent are like unto the experiences of the people of a similarly conditioned province on another continent, there is a curious likeness in the myths of remote countries; and this parallelism in mythologies is one of the phenomena of ethnology which is frequently misinterpreted, and which requires constant consideration on the part of students.

There are few more striking illustrations of the connection between the experiences and the mythology of a people than that found among the Zuñi Indians of southwestern United States. Pressed by a hard environment, including an arid habitat and hostile neighbors, these Indians have been driven into unusual habits and customs, and into an association with plants, animals, and men of such character as to produce a peculiarly acute intelligence. This intelligence is manifested in part in the arts of the tribe, and is manifested also in their elaborate systems of symbolism and mythology. Thus the myths of the Zuñi are of especial interest; they represent an

unusual development of the primitive concepts concerning the relations of things, yet one which is thoroughly characteristic of the Indian's character, as well as with the prescriptorial culture-stage. Moreover, the Zuñi myths are of exceptional interest in that they relate to the preservation and cultivation—indeed to the artificialization—of maize, one of the most useful food plants of the earth. There are indeed certain stages in the history of the artificialization of this grain plant which can not be interpreted save through the traditions and myths of this and other tribes.

In his memoir accompanying this report, Mr Cushing sets forth a part of the interesting and suggestive cosmogony of the Zuñi, so nearly as possible in its aboriginal form. Mr Cushing has had the advantage of long life with the tribe, into which indeed he was formally adopted; he has the advantage, also, of peculiar aptitude in entering into the cumbrous system of prescriptorial expression, and is thus able to appreciate the aboriginal concepts in unusual degree. For these reasons his rendering of the Zuñi creation myths is regarded as notably accurate and trustworthy.

The memoir is introduced by a sketch of Zuñi history, and by a brief exposition of the mythology of this interesting tribe. This introduction may be commended to readers of the report as a faithful picture of the Zuñi tribe in the light of history and ethnology combined.

ACCOMPANYING PAPERS

PREHISTORIC TEXTILE ART

OF

EASTERN UNITED STATES

BY

WILLIAM HENRY HOLMES

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PREHISTORIC TEXTILE ART OF EASTERN UNITED STATES

By W. H. Holmes

INTRODUCTORY.

SCOPE OF THE WORK.

About the year 1890 the writer was requested by the Director of the Bureau of Ethnology to prepare certain papers on aboriginal art, to accompany the final report of Dr. Cyrus Thomas on his explorations of mounds and other ancient remains in eastern United States. These papers were to treat of those arts represented most fully by relics recovered in the field explored. They included studies of the art of pottery, of the textile art and of art in shell, and a paper on native tobacco pipes. Three of these papers were already completed when it was decided to issue the main work of Dr. Thomas independently of the several papers prepared by his associates. It thus happens that the present paper, written to form a limited section of a work restricted to narrow geographic limits, covers so small a fragment of the aboriginal textile field.

The materials considered in this paper include little not germane to the studies conducted by Dr. Thomas in the mound region, the collections used having been made largely by members of the Bureau of Ethnology acting under his supervision. Two or three papers have already been published in the annual reports of the Bureau in which parts of the same collections have been utilized, and a few of the illustrations prepared for these papers are reproduced in this more comprehensive study.

Until within the last few years textile fabrics have hardly been recognized as having a place among the materials to be utilized in the discussion of North American archeology. Recent studies of the art of the mound-building tribes have, however, served to demonstrate their importance, and the evidence now furnished by this art can be placed alongside of that of arts in clay, stone, and metal, as a factor in determining the culture status of the prehistoric peoples and in defining their relations to the historic Indians. This change is due to the more

careful investigations of recent times, to the utilization of new lines of archeologic research, and to the better knowledge of the character and scope of historic and modern native art. A comparison of the textiles obtained from ancient mounds and graves with the work of living tribes has demonstrated their practical identity in materials, in processes of manufacture, and in articles produced. Thus another important link is added to the chain that binds together the ancient and the modern tribes.

DEFINITION OF THE ART.

The textile art dates back to the very inception of culture, and its practice is next to universal among living peoples. In very early stages of culture progress it embraced the stems of numerous branches of industry afterward differentiated through the utilization of other materials or through the employment of distinct systems of construction. At all periods of cultural development it has been a most indispensable art, and with some peoples it has reached a marvelous perfection, both technically and esthetically.

Woven fabrics include all those products of art in which the elements or parts employed in construction are more or less filamental, and are combined by methods conditioned chiefly by their flexibility. The processes employed are known by such terms as wattling, interlacing, plaiting, netting, weaving, sewing, and embroidering.

MATERIALS AND PROCESSES.

Viewing the entire textile field, we find that the range of products is extremely wide. On the one hand there is the rude interlacing of branches, vines, roots, and canes in constructing houses, weirs, cages, rafts, bridges, and the like, and on the other, the spinning of threads of almost microscopic fineness and the weaving of textures of marvelous delicacy and beauty.

The more cultured peoples of Central America and South America had accomplished wonders in the use of the loom and the embroidery frame, but the work of the natives of the United States was on a decidedly lower plane. In basketry and certain classes of garment-making, the inhabitants of the Mississippi valley were well advanced at the period of European conquest, and there is ample evidence to show that the mound-building peoples were not behind historic tribes in this matter. In many sections of our country the art is still practiced, and with a technical perfection and an artistic refinement of high order, as the splendid collections in our museums amply show.

The degree of success in the textile art is not necessarily a reliable index of the culture status of the peoples concerned, as progress in a particular art depends much upon the encouragement given to it by local features of environment. The tribe that had good clay used

earthenware and neglected basketry, and the community well supplied with skins of animals did not need to undertake the difficult and laborious task of spinning fibers and weaving garments and bedding. Thus it appears that well-advanced peoples may have produced inferior textiles and that backward tribes may have excelled in the art. Caution is necessary in using the evidence furnished by the art to aid in determining relative degrees of culture.

SOURCES OF INFORMATION.

The failure of the textile art to secure a prominent place in the field of archeologic evidence is due to the susceptibility of the products to decay. Examples of archaic work survive to us only by virtue of exceptionally favorable circumstances; it rarely happened that mound fabrics were so conditioned, as the soil in which they were buried is generally porous and moist; they were in some cases preserved through contact with objects of copper, the oxides of that metal having a tendency to arrest decay. The custom of burial in caves and rock shelters has led to the preservation of numerous fabrics through the agency of certain salts with which the soil is charged. Preservation by charring is common, and it is held by some that carbonization without the agency of fire has in some cases taken place.

Considerable knowledge of the fabrics of the ancient North American tribes is preserved in a way wholly distinct from the preceding. The primitive potter employed woven textiles in the manufacture of earthenware; during the processes of construction the fabrics were impressed on the soft clay, and when the vessels were baked the impressions became fixed. The study of these impressions led to meager results until the idea was conceived of taking castings from them in clay, wax, or paper; through this device the negative impression becomes a positive reproduction and the fabrics are shown in relief, every feature coming out with surprising distinctness; it is possible even to discover the nature of the threads employed and to detect the manner of their combination.

Evidence of the practice of textile arts by many ancient nations is preserved to us by such implements of weaving as happened to be of enduring materials; spindle-whorls in clay and stone are perhaps the most common of these relics. These objects tell us definitely of the practice of the art, but give little insight into the character of the products. It is a notable fact that evidence of this class is almost wholly wanting in the United States; spindle-whorls have in rare cases been reported from southern localities, and a few writers have mentioned their use by modern tribes.

It happens that in some cases we may learn something of the progress made by vanished peoples in this art by a study of the forms of such of their earthen vessels as were manifestly derived from baskets, or

made in imitation of them. The ornamental art of peoples well advanced in culture often bears evidence of the influence of the system of combination of parts followed originally in the textile arts, and little art, ancient or modern, in which men have endeavored to embody beauty, is without strongly marked traces of this influence. By the study of archaic ornament embodied in clay, wood, and stone, therefore, the archeologist may hope to add something to the sum of his knowledge of ancient textiles. It should be noted that the pottery of the mound-builders shows less evidence of the influence of textile forms than does that of most other nations, and some groups of their ware appear to present no recognizable traces of it whatever.

Although much information has been brought together from all of the sources mentioned, it is not at all certain that we can form anything like a complete or correct notion of the character and scope of the art as practiced by the mound-builders. No doubt the finest articles of apparel were often buried with the dead, but a very small fraction only of the mortuary wrappings or costumes has been preserved, and from vast areas once thickly inhabited by the most advanced tribes nothing whatever has been collected. Of embroideries, featherwork, and the like, so frequently mentioned by early travelers, hardly a trace is left.

The relations of our historic tribes to the ancient peoples of our continent and to all of the nations, ancient and modern, who built mounds and earthworks, are now generally considered so intimate that no objection can be raised to the utilization of the accounts of early explorers in the elucidation of such features of the art as archeology has failed to record. The first step in this study may consist quite properly of a review of what is recorded of the historic art. Subsequently the purely archeologic data will be given.

PRODUCTS OF THE ART.

In undertaking to classify the textile fabrics of the mound region it is found that, although there is an unbroken gradation from the rudest and heaviest textile constructions to the most delicate and refined textures, a number of well-marked divisions may be made. The broadest of these is based on the use of spun as opposed to unspun strands or parts, a classification corresponding somewhat closely to the division into rigid and pliable forms. Material, method of combination of parts, and function may each be made the basis of classification, but for present purposes a simple presentation of the whole body of products, beginning with the rudest or most primitive forms and ending with the most elaborate and artistic products, is sufficient. The material will be presented in the following order: (1) Wattle work; (2) basketry; (3) matting; (4) pliable fabrics or cloths.

WATTLE WORK.

The term wattling is applied to such constructions as employ by interlacing, plaiting, etc., somewhat heavy, rigid, or slightly pliable parts, as rods, boughs, canes, and vines. Primitive shelters and dwellings are very often constructed in this manner, and rafts, cages, bridges, fish weirs, and inclosures of various kinds were and still are made or partly made in this manner. As a matter of course, few of these constructions are known to us save through historic channels; but traces of wattle work are found in the mounds of the lower Mississippi valley, where imprints of the interlaced canes occur in the baked clay plaster with which the dwellings were finished. When we consider the nature of the materials at hand, and the close correspondence in habits and customs of our prehistoric peoples with the tribes found living by the earliest explorers and settlers, we naturally conclude that this class of construction was very common at all known periods of native American history.

The constructors of native dwellings generally employed pliable branches or saplings, which are bound together with vines, twigs, and other more pliable woody forms. John Smith says of the Indians of Virginia[1] that—

> Their houses are built like our Arbors, of small young springs bowed and tyed, and so close covered with Mats, or the barkes of trees very handsomely, that notwithstanding either winde, raine, or weather, they are as warm as stooues, but very smoaky, yet at the toppe of the house there is a hole made for the smoake to goe into right over the fire.

[1] Hist. Virginia, John Smith. Richmond, 1819, vol. I, p. 130.

Butel-Dumont also, in describing the dwellings of the Natchez Indians of the lower Mississippi region, speaks of the door of an Indian cabin "made of dried canes fastened and interlaced on two other canes placed across."[1]

A singular use of wattle work is mentioned by Lafitau. He states that the young men, when going through the ordeal of initiation on attaining their majority, were placed apart in—

An inclosure very strongly built, made expressly for this purpose, one of which I saw in 1694, which belonged to the Indians of Paumaünkie. It was in the form of a sugar loaf and was open on all sides like a trellis to admit the air.[2]

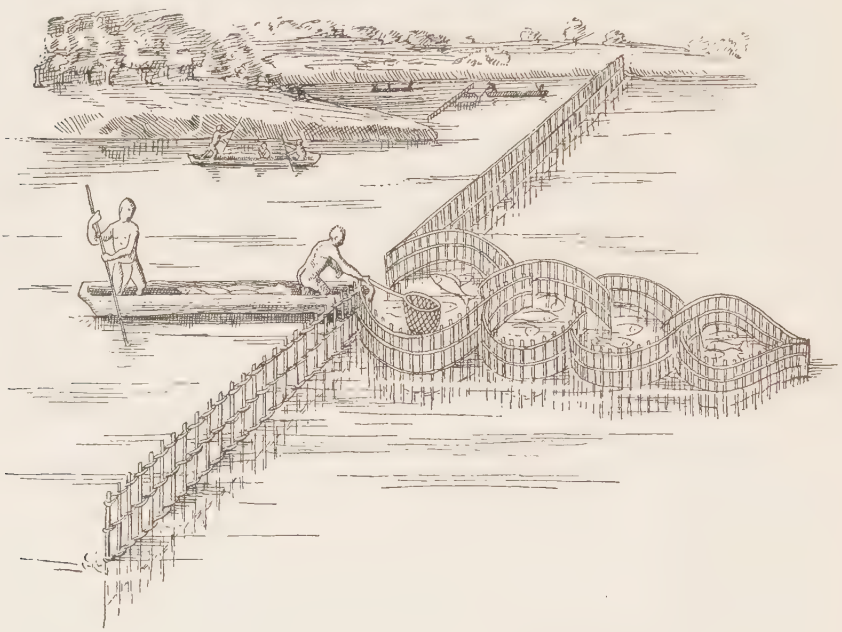


FIG. 1.—Fish weir of the Virginia Indians (after Hariot).

Of a somewhat similar nature was the construction of biers described by Butel-Dumont. Speaking of the Mobilians, he says:

When their chief is dead they proceed as follows: At 15 or 20 feet from his cabin they erect a kind of platform raised about 4½ feet from the ground. This is composed of four large forked poles of oak wood planted in the earth, with others placed across; this is covered with canes bound and interlaced so as to resemble greatly the bed used by the natives.[3]

According to John Lawson, similarly constructed "hurdles" were in use among the Carolina Indians.

The tide-water tribes of the Atlantic coast region made very frequent use of fish weirs, which were essentially textile in character. John Smith mentions their use in Virginia, and Hariot gives a number of plates in which the weirs are delineated. The cut here given (figure 1)

[1] Memoires Historiques sur la Louisiane, George Marie Butel-Dumont. Paris, 1753, vol. II, p. 104.
[2] Mœurs des Sauvages Ameriquains, Père Joseph François Lafitau. Paris, 1724, vol. I, p. 286.
[3] Op. cit., vol. I, p. 244.

is from Hariot's plate XIII. It represents a very elaborate trap; much simpler forms are shown in other plates. Slender poles set in the shallow water are held in place by wattling or interlacing of pliable parts.

It is probable that traps of similar character were used by the mound-building tribes wherever the conditions were favorable. The only apparent traces of such weirs yet found in any part of the country are a number of stumps of stakes discovered by H. T. Cresson in Delaware river near Wilmington, but these appear to be much heavier than would have been used for the purpose by the natives.

Another somewhat usual use of wattling is mentioned by various authors. Butel-Dumont speaks of a raft made of poles and canes, and Du Pratz, writing of the Louisiana Indians, says:

> The conveniencies for passing rivers would soon be suggested to them by the floating of wood upon the water. Accordingly one of their methods of crossing rivers is upon floats of canes, which are called by them Cajeu, and are formed in this manner. They cut a great number of canes, which they tie up into faggots, part of which they fasten together sideways, and over these they lay a few crossways, binding all close together, and then launching it into the water.[1]

We learn from various authors that cage-like coffins were constructed of canes and reeds something after the wattle style; and hampers, cages for animals, chests for treasures or regalia, biers, carrying chairs, fish baskets, beds and seats were often similarly made. These articles, being generally light and portable, and constructed of delicate parts, can as well be classed with basketry as with wattle work.

BASKETRY.

Types of Basketry.

Perhaps no branch of the textile art was of greater importance to the aborigines than basketry. This term may be made to cover all woven articles of a portable kind which have sufficient rigidity to retain definite or stable form without distention by contents or by other extraneous form of support. It will readily be seen that in shape, texture, use, size, etc., a very wide range of products is here to be considered. Basketry includes a number of groups of utensils distinguished from one another by the use to which they are devoted. There are baskets proper, hampers, cradles, shields, quivers, sieves, etc. There is frequent historical mention of the use of basketry, but the descriptions of form and construction are meager. An excellent idea of the ancient art can be gained from the art of the present time, and there is every reason to believe that close correspondence exists throughout.

Baskets.

Lawson refers to basket-making and other textile arts of the Carolina Indians in the following language:

> The Indian women's work is to cook the victuals for the whole family, and to make mats, baskets, girdles, of possum hair, and such like.

[1] Hist. Louisiana, Le Page Du Pratz. English translation, London, 1763, vol. II, pp. 228-229.

The mats the Indian women make are of rushes, and about five feet high, and two fathom long, and sewed double, that is, two together; whereby they become very commodious to lay under our beds, or to sleep on in the summer season in the day time, and for our slaves in the night.

There are other mats made of flags, which the Tuskeruro Indians make, and sell to the inhabitants.

The baskets our neighboring Indians make are all made of a very fine sort of bull-rushes, and sometimes of silk grass, which they work with figures of beasts, birds, fishes, &c.

A great way up in the country, both baskets and mats are made of the split reeds, which are only the outward shining part of the cane. Of these I have seen mats, baskets, and dressing boxes, very artificially done.[1]

James Adair, although a comparatively recent writer, gives such definite and valuable information regarding the handiwork of the Southern Indians that the following extracts may well be made. Speaking of the Cherokees, he remarks:

They make the handsomest clothes baskets, I ever saw, considering their materials. They divide large swamp canes, into long, thin, narrow splinters, which they dye of several colours, and manage the workmanship so well, that both the inside and outside are covered with a beautiful variety of pleasing figures; and, though for the space of two inches below the upper edge of each basket, it is worked into one, through the other parts they are worked asunder, as if they were two joined a-top by some strong cement. A large nest consists of eight or ten baskets, contained within each other. Their dimensions are different, but they usually make the outside basket about a foot deep, a foot and an half broad, and almost a yard long.[2]

This statement could in most respects be made with equal truth and propriety of the Cherokee work of the present time; and their pre-Columbian art must have been even more pleasing, as the following paragraph suggests:

The Indians, by reason of our supplying them so cheap with every sort of goods, have forgotten the chief part of their ancient mechanical skill, so as not to be well able now, at least for some years, to live independent of us. Formerly, those baskets which the Cheerake made, were so highly esteemed even in South Carolina, the politest of our colonies, for domestic usefulness, beauty, and skilful variety, that a large nest of them cost upwards of a moidore.[3]

That there was much uniformity in the processes and range of products and uses throughout the country is apparent from statements made by numerous writers. Speaking of the Louisiana Indians, Du Pratz says:

The women likewise make a kind of hampers to carry corn, flesh, fish, or any other thing which they want to transport from one place to another; they are round, deeper than broad, and of all sizes. * * * They make baskets with long lids that roll doubly over them, and in these they place their earrings and pendants, their bracelets, garters, their ribbands for their hair, and their vermillion for painting themselves, if they have any, but when they have no vermillion they boil ochre, and paint themselves with that.[4]

It happens that few baskets have been recovered from mounds and graves, but they are occasionally reported as having been discovered in

[1] Hist. of Carolina, etc., John Lawson. London, 1714, pp. 307, 308.

[2] History of the American Indians. London, 1775, p. 424.

[3] Ibid., p. 424.

[4] Hist. Louisiana. English translation, London, 1763, vol. II, pp. 227-228.

caverns and shelters where conditions were especially favorable to their preservation. Such specimens may as reasonably be attributed to the mound-building as to the other Indians. The following statement is from John Haywood:

On the south side of Cumberland river, about 22 miles above Cairo, * * * is a cave * * *. In this room, near about the center, were found sitting in baskets made of cane, three human bodies; the flesh entire, but a little shrivelled, and not much so. The bodies were those of a man, a female and a small child. The complexion of all was very fair, and white, without any intermixture of the copper colour. Their eyes were blue; their hair auburn, and fine. The teeth were very white, their stature was delicate, about the size of the whites of the present day. The man was wrapped in 14 dressed deer skins. The 14 deer skins were wrapped in what those present called blankets. They were made of bark, like those found in the cave in White county. The form of the baskets which inclosed them, was pyramidal, being larger at the bottom, and declining to the top. The heads of the skeletons, from the neck, were above the summits of the blankets.[1]

Sieves and Strainers.

It is apparent that baskets of open construction were employed as sieves in pre-Columbian as well as in post-Columbian times. Almost any basket could be utilized on occasion for separating fine from coarse particles of food or other pulverulent substances, but special forms were sometimes made for the purpose, having varying degrees of refinement to suit the material to be separated.

Bartram mentions the use of a sieve by the Georgia Indians in straining a "cooling sort of jelly" called conti, made by pounding certain roots in a mortar and adding water.

Butel-Dumont describes the sieves and winnowing fans of the Louisiana Indians. The Indian women, he says, make very fine sieves—

With the skin which they take off of the canes; they also make some with larger holes, which serve as bolters, and still others without holes, to be used as winnowing fans. * * * They also make baskets very neatly fashioned, cradles for holding maize; and with the tail feathers of turkeys, which they have much skill in arranging, they make fans not only for their own use, but which even our French women do not disdain to use.[2]

Le Page Du Pratz says that "for sifting the flour of their maiz, and for other uses, the natives make sieves of various finenesses of the splits of cane;"[3] and a similar use by the Indians of Virginia is recorded by John Smith:

They vse a small basket for their Temmes, then pound againe the great, and so separating by dashing their hand in the basket, receiue the flowr in a platter of wood scraped to that forme with burning and shels.[4]

From Hakluyt we have the following:

Their old wheat they firste steepe a night in hot water, and in the morning pounding yt in a morter, they use a small baskett for the boulter or searser, and when

[1] Nat. and Abor. Hist. of Tenn., John Haywood. Nashville, 1823, pp. 191–192.
[2] Op. cit., vol. I, p. 154.
[3] Op. cit., vol. II, p. 226.
[4] Hist. Virginia, John Smith. Richmond, 1819, p. 127.

they have syfted fourth the finest, they pound againe the great, and so separating yt by dashing their hand in the baskett, receave the flower in a platter of wood, which, blending with water, etc.[1]

CRADLES.

That cradles of textile construction were used by the mound-builders may be taken for granted. The following is from Du Pratz, who is speaking of the work of the inhabitants of the lower Mississippi:

This cradle is about two feet and a half long, nine inches broad. It is skillfully made of straight canes of the length desired for the cradle, and at the end they are cut in half and doubled under to form the foot. The whole is only half a foot high. This cradle is very light, weighing only two pounds. * * * The infant being rocked lengthwise, its head is not shaken as are those who are rocked from side to side, as in France. * * * The cradle is rocked by means of two ends of canes, which make two rollers.[2]

SHIELDS.

Woven targets or shields would seem to be rather novel objects, but such are mentioned by John Smith, who used those belonging to friendly Indians in an encounter on the Chesapeake:

Here the Massawomek Targets stood vs in good stead, for vpon Mosco's words we had set them about the forepart of our Boat like a forecastle, from whence we securely beat the Salvages from off the plaine without any hurt. * * * Arming ourselues with these light Targets (which are made of little small sticks woven betwixt strings of their hempe and silke grasse, as is our cloth, but so firmly that no arrow can possibly pierce them).[3]

MATTING.

No class of articles of textile nature were more universally employed by the aborigines than mats of split cane, rushes, and reeds, and our information, derived from literature and from such remnants of the articles themselves as have been recovered from graves and caves, is quite full and satisfactory. Mats are not so varied in form and character as are baskets, but their uses were greatly diversified; they served for carpeting, seats, hangings, coverings, and wrappings, and they were extensively employed in permanent house construction, and for temporary or movable shelters. A few brief extracts will serve to indicate their use in various classes of construction by the tribes first encountered by the whites.

Hariot says that the houses of the Virginia Indians—

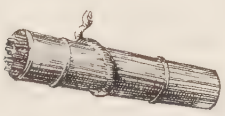
Are made of small poles made fast at the tops in rounde forme after the maner as is vsed in many arbories in our gardens of England, in most townes couered with barkes, and in some with artificiall mattes made of long rushes; from the tops of the houses downe to the ground.[4]

It would appear from a study of the numerous illustrations of houses given by this author that the mats so often referred to were identical

[1] Hist. of Travaile into Virginia: Wm. Strachey, Hakluyt Society, Lond., 1844, vol. VI, p. 73.
[2] Hist. Louisiana, vol. II, pp. 310, 311.
[3] Op. cit., p. 185.
[4] A Brief and True account of the New Found Land of Virginia, Thomas Hariot, p. 24.

a

b



d

c

e

PRODUCTS OF THE TEXTILE ART.

a. Openwork fish baskets of Virginia Indians; *b*, manner of weaving; *c*, basket strainer; *d*, quiver of rushes; *e*, mat of rushes.

in construction with those still in use among the tribes of the upper Mississippi and the far west. The rushes are laid close together side by side and bound together at long intervals by cords intertwined across. In *e*, plate I, is reproduced a small portion of a mat from Hariot's engraving of the dead-house of the Virginia Indians, which shows this method of construction.

The modern use of mats of this class in house construction is known by an example which I have seen represented in a small photograph, taken about the year 1868, and representing a Chippewa village, situated somewhere in the upper Missouri valley, probably not far from Sioux City, Iowa.

Mats were used not only in and about the dwellings of the aborigines, but it was a common practice to carry them from place to place to sleep on, or for use as seats or carpeting in meetings or councils of ceremonious nature. The latter use is illustrated in a number of the early

FIG. 2.—Use of mats in an Indian council (after Lafitau).

accounts of the natives. Figure 2, copied from Lafitau, serves to indicate the common practice.

The omnipresent sweat-house of the aborigines is thus described by Smith:

> Sometimes they are troubled with dropsies, swellings, aches, and such like diseases; for cure whereof they build a Stoue in the forme of a Doue-house with mats, so close that a few coales therein covered with a pot, will make the patient sweat extreamely.[1]

Bartram, speaking of the Seminoles, states that the wide steps leading up to the canopied platform of the council house are "covered with carpets or mats, curiously woven of split canes dyed of various colours."[2]

[1] A Brief and True account of the New Found Land of Virginia, Thomas Hariot, p. 137.

[2] William Bartram's Travels, etc. London, 1792, p. 302.

The use of mats in the mound country in very early times is described by Joutel as follows:

> Their moveables are some bullocks' hides and goat skins well cured, some mats close wove, wherewith they adorn their huts, and some earthen vessels which they are very skilful at making, and wherein they boil their flesh or roots, or sagamisé, which, as has been said, is their pottage. They have also some small baskets made of canes, serving to put in their fruit and other provisions. Their beds are made of canes, raised 2 or 3 feet above the ground, handsomely fitted with mats and bullocks' hides, or goat skins well cured, which serve them for feather beds, or quilts and blankets; and those beds are parted one from another by mats hung up.[2]

The mats so much used for beds and carpets and for the covering of shelters, houses, etc., were probably made of pliable materials such as rushes. De la Potherie illustrates their use as beds,[1] one end of the mat being rolled up for a pillow as shown in figure 3.

FIG. 3.—Use of mat in sleeping (after De la Potherie).

The sizes of mats were greatly varied; the smallest were sufficient for seating only a single person, but the largest were many yards in length, the width being restricted to a few feet by the conditions of construction.

Mats were woven in two or more styles. Where the strands or parts were uniform in size and rigidity they were simply interlaced, but when one strong or rigid series was to be kept in place by a pliable series, the latter were twisted about the former at the intersections as in ordinary twined weaving. The heavy series of strands or parts were held together side by side by the intertwined strands placed far apart, a common practice yet among native mat-makers. Much variety of character and appearance was given to the fabric by varying the order of the strands in intersection. It was a common practice to interweave strands of different size, shape, or color, thus producing borders and patterns of no little beauty. Du Pratz thus mentions the use of dyes by the Louisiana Indians: "The women sometimes add to this furniture of the bed mats woven of cane, dyed of 3 colours, which colours in the weaving are formed into various figures."[3] This is well illustrated

[1] Hist. de l'Amér. Sept., Bacqueville de la Potherie. Paris, 1722, vol. III. Plate opposite p. 24.
[2] Joutel, in B. F. French's Historical Collections of Louisiana. New York, 1846, p. 149.
[3] Hist. Louisiana, Du Pratz. English translation, London, 1763, vol. II, p. 227.

in the mat from a rock shelter in Tennessee, later to be described, and the Indians of the east and north practiced the same art.

Speaking of the ceremony of smoking the calumet among the Iroquois, De la Potherie says:

> The ceremony is held in a large cabin in winter and in summer in an open field. The place being chosen, it is surrounded with branches to shade the company. In the center is spread a large mat of canes dyed in various colors, which serves as a carpet.[1]

Frequent mention is made of the use of mats in burial. Two brief extracts will serve to illustrate this use. Butel-Dumont makes the following statement regarding tribes of the lower Mississippi:

> The Paskagoulas and Billoxis do not inter their chief when he dies, but they dry the corpse with fire and smoke in such a way that it becomes a mere skeleton. After it is reduced to this state they carry it to the temple (for they have one as well as the Natchez) and put it in the place of its predecessor, which they take from the spot it occupied and place it with the bodies of the other chiefs at the bottom of the temple, where they are arranged one after the other, standing upright like statues. As for the newly deceased, he is exposed at the entrance of the temple on a sort of altar or table made of cane and covered with a fine mat very neatly worked in red and yellow squares with the skin of the canes.[2]

Brackenridge[3] says that a few years ago, in the state of Tennessee, "Two human bodies were found in a copperas cave in a surprising state of preservation. They were first wrapped up in a kind of blanket, supposed to have been manufactured of the lint of nettles, afterwards with dressed skins, and then a mat of nearly 60 yards in length."

PLIABLE FABRICS.

Development of Spinning and Weaving.

The use of simple strands or parts in textile art precedes the use of spun threads, but the one use leads very naturally up to the other. In employing rushes, stems, grasses, etc., the smaller strands were doubled to secure uniformity of size, and when a number of parts were used they were combined into one by twisting or plaiting. In time the advantage in strength and pliability of twisted strands came to be recognized, and this led to the general utilization of fibrous substances, and finally to the manufacture of suitable fibers by manipulating the bark of trees and plants. Spinning was probably not devised until the weaver's art had made considerable advance, but its invention opened a new and broad field and led to the development of a magnificent industry. Semi-rigid fabrics served for a wide range of uses, as already described, but soft and pliable cloths for personal use and ornament were made possible only by the introduction of spinning.

On the arrival of the whites the native art was well advanced; thread, cordage, and even ropes of considerable weight were made with

[1] Hist. de l'Amér. Sept., vol. II, p. 17.
[2] Mem. sur la Louisiane, vol. I, pp. 240–241.
[3] Views of Louisiana, H. M. Brackenridge, 1817, p. 178.

a degree of uniformity and refinement that surprises us. The finest threads with which I am acquainted are perhaps not as fine as our no. 10 ordinary spool cotton thread, but we are not justified in assuming that more refined work was not done. What we have is only that which happened to be preserved through burial with the dead or by impression on the plastic surface of clay used in the arts.

The materials employed for spinning by the aborigines were greatly diversified. Through historical as well as through purely archeologic sources we learn that both vegetal and animal filaments and fibers were freely used. The inner bark of the mulberry was a favorite material, but other fibrous barks were utilized. Wild hemp, nettles, grasses, and other like growths furnished much of the finer fibers. The hackling was accomplished by means of the simplest devices, such as pounding with hammers or sticks. The hair and sinews of animals were frequently spun into threads and woven into cloth.

A few citations from early authors will indicate sufficiently for present purposes the methods of spinning and weaving employed by tribes which, if not in all cases mound-builders, were at least the neighbors and relatives of the mound-building Indians.

Cloths.

The character of the woven articles is to a great extent indicated in the extracts which follow. It evidently was not customary to weave "piece" goods, but rather to make separate units of costumes, furnishing, etc., for use without cutting, fitting, and sewing. Each piece was practically complete when it came from the frame or loom. For clothing and personal use there were mantles, shawls, and cloaks to be worn over one or both shoulders or about the body as described by Hariot, Smith, the Knight of Elvas, Du Pratz, and others; there were skirts fastened about the waist and drawn with an inserted cord or looped over a belt; there were belts, sashes, garters, shot pouches, and bags. For household use there were hangings, covers for various articles, and bedclothing; there were nets for fishing and cords for angling. Some of these extracts describe the whole group of activities included in the practice of the art as well as the use of the products. I have considered it preferable to quote as a unit all that is said on the subject by each author, giving cross reference, when necessary, in discussing particular topics under other headings.

Weaving among the Indians of New Jersey, Pennsylvania, New York, and the northeast is described by Kalm, De la Potherie, and others. The following extracts are from Kalm, and will serve to indicate the status of the art over a wide area:

Apocynum cannabinum was by the Swedes called Hemp of the Indians; and grew plentifully in old corn grounds, in woods on hills, and in high glades. The Swedes had given it the name of Indian hemp, because the Indians formerly, and even now, apply it to the same purposes as the Europeans do hemp; for the stalk may be divided into filaments, and is easily prepared. When the Indians were yet settled among

the Swedes, in Pensylvania and New Jersey, they made ropes of this apocynum, which the Swedes bought, and employed them as bridles, and for nets. These ropes were stronger, and kept longer in water, than such as were made of common hemp. The Swedes commonly got fourteen yards of these ropes for one piece of bread. Many of the Europeans still buy such ropes, because they last so well. The Indians likewise make several other stuffs of their hemp. On my journey through the country of the Iroquese, I saw the women employed in manufacturing this hemp. They made use neither of spinning wheels nor distaffs, but rolled the filaments upon their bare thighs, and made thread and strings of them, which they dyed red, yellow, black, etc., and afterwards worked them into stuffs, with a great deal of ingenuity. The plant is perennial, which renders the annual planting of it altogether unnecessary. Out of the root and stalk of this plant, when it is fresh, comes a white milky juice, which is somewhat poisonous. Sometimes the fishing tackle of the Indians consists entirely of this hemp. The Europeans make no use of it, that I know of.[1]

In another place this author describes the weaving of bark fibers:

The *Dirca palustris*, or Mouse-wood, is a little shrub which grows on hills, towards swamps and marshes, and was now in full blossom. The English in Albany call it Leather-wood, because its bark is as tough as leather. The French in Canada call it Bois de Plomb, or Leaden-wood because the wood itself is as soft and as tough as lead. The bark of this shrub was made use of for ropes, baskets, etc., by the Indians, whilst they lived among the Swedes. And it is really very fit for that purpose, on account of its remarkable strength and toughness, which is equal to that of the Lime-tree bark. The English and the Dutch in many parts of North America, and the French in Canada, employ this bark in all cases where we make use of Lime-tree bark in Europe. The tree itself is very tough, and you cannot easily separate its branches without the help of a knife: some people employ the twigs for rods.[2]

De la Potherie, who wrote at an earlier date than Kalm, says—

The women spin on their knees, twisting the thread with the palm of the hand; they make this thread, which should rather be called twine (fisselle), into little balls.

Hariot, John Smith, and Adair bear witness to the primitive practice of the art in Virginia and the Carolinas. Smith uses the following words:

Betwixt their hands and thighes, their women vse to spin, the barkes of trees, Deere sinewes, or a kinde of grasse they call Pemmenaw, of these they make a thread very even and readily. This thread serveth for many vses. As about their housing apparell, as also they make nets for fishing, for the quantitie as formally braded as ours. They make also with it lines for angles.[4]

The Cherokees and other Indians with whom Adair came in contact preserved in their purity many of the ancient practices. The following extracts are, therefore, of much importance to the historian of the textile art in America:

Formerly, the Indians made very handsome carpets. They have a wild hemp that grows about six feet high, in open, rich, level lands, and which usually ripens in July: it is plenty on our frontier settlements. When it is fit for use, they pull, steep, peel, and beat it; and the old women spin it off the distaffs, with wooden machines, having some clay on the middle of them, to hasten the motion. When the

[1] Travels in North America, Peter Kalm. English translation, London, 1771, vol. II, pp. 131,132.
[2] Ibid., pp. 148-149.
[3] Hist. de l'Amérique, Sept., vol. III, p. 34.
[4] Hist. Virginia. Richmond, 1819, pp. 132-133.

coarse thread is prepared, they put it into a frame about six feet square, and instead of a shuttle, they thrust through the thread with a long cane, having a large string through the web, which they shift at every second course of the thread. When they have thus finished their arduous labour, they paint each side of the carpet with such figures, of various colours, as their fruitful imaginations devise; particularly the images of those birds and beasts they are acquainted with; and likewise of themselves, acting in their social, and martial stations. There is that due proportion and so much wild variety in the design, that would really strike a curious eye with pleasure and admiration. J. W—t, Esq., a most skilful linguist in the Muskohge dialect, assures me, that time out of mind they passed the woof with a shuttle; and they have a couple of threddles, which they move with the hand so as to enable them to make good dispatch, something after our manner of weaving. This is sufficiently confirmed by their method of working broad garters, sashes, shot pouches, broad belts, and the like, which are decorated all over with beautiful stripes and chequers.

The women are the chief, if not the only, manufacturers; the men judge that if they performed that office, it would exceedingly depreciate them. * * * In the winter season, the women gather buffalo's hair, a sort of coarse, brown, curled wool; and having spun it as fine as they can, and properly doubled it, they put small beads of different colours upon the yarn, as they work it, the figures they work in those small webs, are generally uniform, but sometimes they diversify them on both sides. The Choktah weave shot-pouches which have raised work inside and outside. They likewise make turkey feather blankets with the long feathers of the neck and breast of that large fowl—they twist the inner end of the feathers very fast into a strong double thread of hemp, or the inner bark of the mulberry tree, of the size and strength of coarse twine, as the fibres are sufficiently fine, and they work it in manner of fine netting. As the feathers are long and glittering, this sort of blankets is not only very warm, but pleasing to the eye.[1]

The extent and importance of the art among the Gulf tribes are indicated by a number of early observers. The Knight of Elvas speaks of the use of blankets by the Indians, 83 degrees west longitude, and 32 degrees north latitude, or near the central portion of Georgia:

These are like shawls, some of them are made from the inner barks of trees, and others from a grass resembling nettle, which, by threading out, becomes like flax. The women use them for covering, wearing one about the body from the waist downward, and another over the shoulder, with the right arm left free, after the manner of the gypsies: the men wear but one, which they carry over their shoulders in the same way, the loins being covered with a bragueiro of deer-skin, after the fashion of the woolen breech-cloth that was once the custom of Spain. The skins are well dressed, the color being given to them that is wished, and in such perfection, that, when of vermilion, they look like very fine red broadcloth, and when black, the sort in use for shoes, they are of the purest. The same hues are given to blankets.[2]

At Cutifachiqui similar fabrics were observed:

In the barbacoas were large quantities of clothing, shawls of thread, made from the barks of trees and others of feathers, white gray, vermilion and yellow, rich and proper for winter.[3]

The frequent mention of fabrics used by the Indians for shawls, mantles, etc., makes it plain that such were in very general use when

[1] History of the American Indians. London, 1775, pp. 422, 423.

[2] Narratives of the Career of Hernando de Soto in the Conquest of Florida as told by a Knight of Elvas. Translated by Buckingham Smith. New York, 1866, p. 52.

[3] Ibid., p. 63.

the town of Pacaha was captured, and the Spaniards clothed themselves with mantles, cassocks, and gowns made from these native garments. Everywhere woven shawls were a principal feature of the propitiatory gifts of the natives to the Spaniards.

The extent of this manufacture of hempen garments by the Indians of the lower Mississippi is well indicated in the account of the adventures of the expedition on the western side of the Mississippi at Aminoga. The Spaniards undertook the construction of brigantines by means of which they hoped to descend the Mississippi and to pass along the gulf coast to Mexico. A demand was made upon the natives for shawls to be used in the manufacture of sails, and great numbers were brought. Native hemp and the ravelings of shawls were used for calking the boats.[1] What a novel sight must have been this first European fleet on the great river, consisting of five brigantines impelled by sails of native manufacture!

It is worthy of note that in this region (of the lower Mississippi) the Spaniards saw shawls of cotton, brought, it was said, from the west—probably the Pueblo country, as they were accompanied by objects that from the description may have been ornaments of turquois.[2]

The following is from Du Pratz:

> Many of the women wear cloaks of the bark of the mulberry-tree, or of the feathers of swans, turkies, or India ducks. The bark they take from young mulberry shoots that rise from the roots of trees that have been cut down; after it is dried in the sun they beat it to make all the woody part fall off, and they give the threads that remain a second beating, after which they bleach them by exposing them to the dew. When they are well whitened they spin them about the coarseness of pack-thread, and weave them in the following manner: they plant two stakes in the ground about a yard and a half asunder, and having stretched a cord from the one to the other, they fasten their threads of bark double to this cord, and then interweave them in a curious manner into a cloak of about a yard square with a wrought border round the edges. * * * The girls at the age of eight or ten put on a little petticoat, which is a kind of fringe made of threads of mulberry bark:[3]

This is illustrated farther on.

The manner of weaving in the middle and upper Mississippi country is described by Hunter, who, speaking of the Osage Indians and their neighbors, says:

> The hair of the buffalo and other animals is sometimes manufactured into blankets; the hair is first twisted by hand, and wound into balls. The warp is then laid of a length to answer the size of the intended blanket, crossed by three small smooth rods alternately beneath the threads, and secured at each end to stronger rods supported on forks, at a short distance above the ground. Thus prepared, the woof is filled in, thread by thread, and pressed closely together, by means of a long flattened wooden needle. When the weaving is finished, the ends of the warp and woof are

[1] Narratives of the Career of Hernando de Soto in the Conquest of Florida as told by a Knight of Elvas. Translated by Buckingham Smith. New York, 1866, p. 160–70.

[2] Ibid., p. 164.

[3] Hist. Louisiana, op. cit., vol. II, p. 23.

tied into knots, and the blanket is ready for use. In the same manner they construct mats from flags and rushes, on which, particularly in warm weather, they sleep and sit.[1]

Fabrics of various kinds were employed in burial, although not generally made for that purpose. The wrappings of dead bodies were often very elaborate, and the consignment of these to tombs and graves where the conditions were favorable to preservation has kept them for long periods in a most perfect state. By exhumation we have obtained most of our information on this subject. Our knowledge is, however, greatly increased by descriptions of such burial customs as were witnessed in early times. Extracts already given refer to the use of fabrics in mortuary customs. Many others could be cited but the following seems sufficient:

After the dead person has lain a day and a night in one of their hurdles of canes, commonly in some out house made for that purpose, those that officiate about the funeral go into the town, and the first young men they meet withal, that have blankets or match coats on, whom they think fit for their turn, they strip them from their backs, who suffer them so to do without any resistance. In these they wrap the dead bodies, and cover them with two or three mats which the Indians make of rushes or cane; and, last of all, they have a long web of woven reeds or hollow canes, which is the coffin of the Indians, and is brought round several times and tied fast at both ends, which, indeed, looks very decent and well. Then the corps is brought out of the house into the orchard of peach trees, where another hurdle is made to receive it, about which comes all the relations and nation that the dead person belonged to, besides several from other nations in alliance with them; all which sit down on the ground upon mats spread there for that purpose.[2]

NETS.

The manufacture and use of nets by natives in various parts of the country are recorded by early writers, some of whom have already been quoted. Speaking of the Iroquois De la Potherie says:

The old men and those who can not or do not wish to go to war or the chase, make nets and are fishers. This is a plebian trade among them. Their nets are made of thread of nettles or of white wood, the bark of which they make into thread by means of lye which renders it strong and pliable.[3]

In another place the same author says:

The Sauteurs, who are beyond the Missisakis, take their name from a Saut (waterfall) which flows from Lake Superior into Lake Huron by a great fall whose rapids are extremely violent. These people are very skillful in fishery by which they obtain white fish as large as salmons. They cross all these terrible rapids into which they cast a net like a sack, a little more than half an ell in width by one in depth attached to a forked stick about 15 feet long.[4]

A novel use of nets is recorded by this author as follows:

For taking pigeons in summer in nets, they make a broad path in the woods and attach to two trees, one on each side, a large net made in the shape of a sack well opened.[5]

[1] Memoirs of a captive among the Indians of North America, John D. Hunter. London, 1823, pp. 289–290.

[2] Hist. of Carolina, John Lawson. London, 1714; reprint, Raleigh, N. C., 1860, pp. 293–294.

[3] Histoire de l'Amérique Septentrionale, Bacqueville de la Potherie, vol. III, pp. 33–34.

[4] Ibid., vol. II, pp. 60–61.

[5] Ibid., vol. II, p. 80.

Du Pratz, speaking of the fishing nets of the Louisiana Indians, states that they "are meshed like ours and made of lime-tree bark; the large fish are shot with arrows."[1]

Feather Work.

Feather work was one of the most remarkable arts of the natives of Mexico and other southern countries at the period of the conquest. The feathers were sometimes woven in with the woof and sometimes applied to a network base after the fashion of embroidery. Rarely, it may be imagined, were either spun or unspun fabrics woven of feathers alone. Very pleasing specimens of ancient Peruvian feather work are recovered from graves at Ancon and elsewhere, and the method of inserting the feathers is illustrated in the Sixth Annual Report of the Bureau of Ethnology.[2] In few instances has such work been recovered from mounds or burial places, but there can be no doubt that the mound-building tribes were experts in this art. Frequent mention is made of the feather work of the natives by the earliest explorers of the Mississippi valley, and the character of the work may be gathered from the extracts already given and from those which follow.

John Smith, speaking of the feather work of the Virginia Indians, says:

> We haue seene some vse mantels made of Turky feathers, so prettily wrought and woven with threads that nothing could be discerned but the feathers.[3]

Lawson mentions a "doctor" of the Santee nation who "was warmly and neatly clad with a match coat, made of turkies feathers, which makes a pretty show, seeming as if it was a garment of the deepest silk shag."[4]

In another place the same author says:

> Their feather match coats are very pretty, especially some of them, which are made extraordinary charming, containing several pretty figures wrought in feathers, making them seem like a fine flower silk shag; and when new and fresh, they become a bed very well, instead of a quilt. Some of another sort are made of hair, raccoon, bever, or squirrel skins, which are very warm. Others again are made of the green part of the skin of a mallard's head, which they sew perfectly well together, their thread being either the sinews of a deer divided very small, or silk grass. When these are finished, they look very finely, though they must needs be very troublesome to make.[5]

Du Pratz thus describes the art in Louisiana:

> If the women know how to do this kind of work they make mantles either of feathers or woven of the bark of the mulberry tree. We will describe their method of doing this. The feather mantles are made on a frame similar to that on which the peruke makers work hair; they spread the feathers in the same manner and fasten them on old fish nets or old mantles of mulberry bark. They are placed, spread in this manner, one over the other and on both sides; for this purpose small turkey feathers are used; women who have feathers of swans or India ducks, which are white, make these feather mantles for women of high rank.[6]

[1] Histoire de la Louisiane, vol. II, pp. 179–180.
[2] The Textile Art, W. H. Holmes, p. 231.
[3] Hist. Virginia, John Smith. Richmond, 1819, vol. I, p. 130.
[4] Hist. Carolina, John Lawson. Raleigh, 1860, p. 37.
[5] Ibid., pp. 311–312.
[6] Hist. de la Louisiane, vol. II, pp. 191–192.

Butel-Dumont describes feather work of the natives of Louisiana briefly as follows:

They [the women] also, without a spinning wheel or distaff, spin the hair or wool of cattle of which they make garters and ribands; and with the thread which they obtain from lime-tree bark, they make a species of mantle, which they cover with the finest swan's feathers fastened one by one to the material. A long task indeed, but they do not count this trouble and time when it concerns their satisfaction.[1]

Embroidery.

The use of beads, quills, and other articles to beautify the surfaces of fabrics and skins was as common, no doubt, with the ancient as with the modern native inhabitants of the Mississippi valley. In discoursing on the dress of native women of Louisiana Butel-Dumont says that the young girls wear—

* * * a sort of network attached to the waist and terminating in a point, * * * both sides of which are ornamented with ribbons of thread made from lime-tree fiber, also made into network. From the waist to the knees hang several cords of the same thread, to the ends of which are attached claws of birds of prey, such as eaglets, crows, etc., so that when the girls walk these make a rattling noise which is highly pleasing to them. This kind of ornament does not illy resemble those nets which we use to cover our horses to protect them from flies.[2]

From Du Pratz we have the following:

The women make also designs in embroidery with the skin of the porcupine; they remove for this purpose the skin of this animal, which is white and black; they split it very fine to use as embroidery thread, dye a part of the white skin a red color, another part yellow, and a third part is left white; they usually work on black skin, and dye the black a reddish brown; but if they work on bark, the black [threads] remain the same. Their designs are very similar to some of those found in Gothic architecture; they are composed of straight lines which form right angles at their conjunction, which is commonly called the corner of a square. They also work similar designs on mantles and coverings which they make with the bark of the mulberry tree.[3]

John Smith testifies to the same practices in Virginia as shown in the following lines:

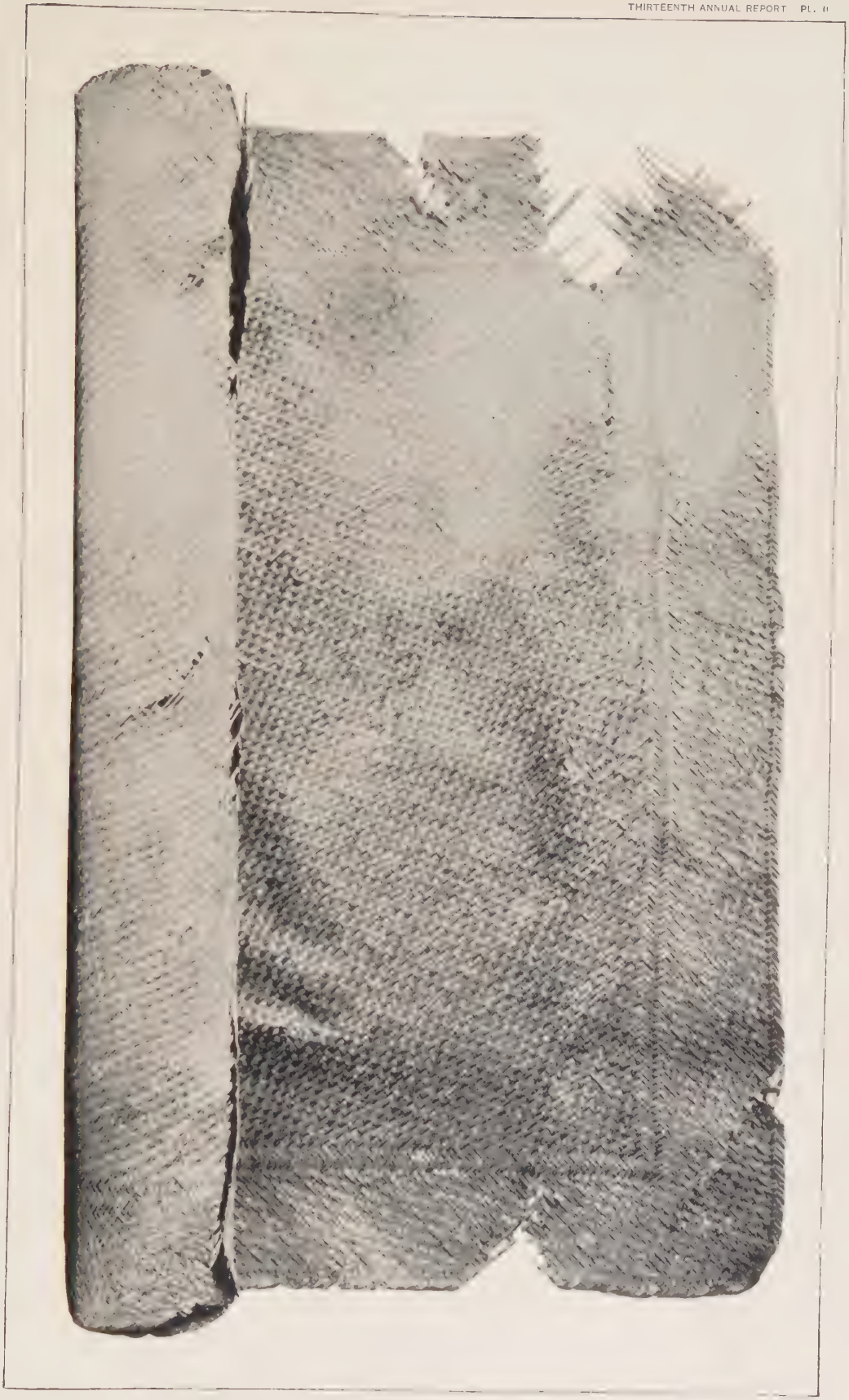
For their apparell, they are sometimes covered with the skinnes of wilde beasts, which in Winter are dressed with the hayre, but in Sommer without. The better sort vse large mantels of Deare skins, not much differing in fashion from the Irish mantels. Some imbrodered with white beads, some with Copper, other painted after their manner. * * * We haue seene some vse mantels made of Turky feathers, so prettily wrought and woven with threads that nothing could be discerned but the feathers.[4]

FOSSIL FABRICS.

Modes of Preservation.

Contenting myself with the preceding references to the practice of the arts of spinning and weaving in the various regions of the country,

[1] Memoire sur la Louisiane. Paris, 1753, vol. I, pp. 154–155.
[2] Ibid., vol, I, pp. 138–139.
[3] Historie de la Louisiane, vol. II, pp. 184–185.
[4] Hist. Virginia. Richmond, 1819, vol. I, pp. 129–130.



MAT OF SPLIT CANE.

I pass on to an examination of the archeologic material which includes traces or remnants of the weaver's work from all sections of the country. As already mentioned, there are a number of ways in which textile articles or data relating to them may be preserved in such manner as to permit examination and study.

Through charring by the use of fire in burial rites, and by contact with copper or preservative salts in burial caves, numerous pieces of cloth and parts of costumes have come into our possession. One of the most fertile sources of information has but recently been made available. The ancient potter employed woven fabrics in handling, finishing, and decorating pottery. From mounds, graves, and dwelling sites, all over the country, vases and sherds are found covered with impressions of these fabrics, and so well preserved that by taking casts in clay or wax entirely satisfactory restorations are made. Something may be learned from the recovery of implements of spinning and weaving, but up to this time the only relics secured are a few rather rude spindle whorls.

I shall present in the following paragraphs such portions of the available data as seem calculated to illustrate briefly and clearly the nature of the ancient art.

Fabrics from Caves and Shelters.

At an early date in the history of the country reports began to find their way into print relating to the discovery of mortuary fabrics in caverns and shelters. Extracts from some of these publications may be given.

From the writing of John Haywood historian of Tennessee, we have the following:

> In the spring of the year 1811, was found in a copperas cave in Warren county, in West Tennessee, about 15 miles southwest from Sparta, and 20 from McMinnville, the bodies of two human beings, which had been covered by the dirt or ore from which copperas was made. One of these persons was a male, the other a female. They were interred in baskets, made of cane, curiously wrought, and evidencing great mechanic skill. They were both dislocated at the hip joint, and were placed erect in the baskets, with a covering made of cane to fit the baskets in which they were placed. The flesh of these persons was entire and undecayed, of a brown dryish colour, produced by time, the flesh having adhered closely to the bones and sinews. Around the female, next her body, was placed a well dressed deer skin. Next to this was placed a rug, very curiously wrought, of the bark of a tree and feathers. The bark seemed to have been formed of small strands well twisted. Around each of these strands, feathers were rolled, and the whole woven into a cloth of firm texture, after the manner of our common coarse fabrics. This rug was about three feet wide, and between six and seven feet in length. The whole of the ligaments thus framed of bark were completely covered with feathers, forming a body of about one eighth of an inch in thickness, the feathers extending about one quarter of an inch in length from the strand to which they were confined. The appearance was highly diversified by green, blue, yellow and black, presenting different shades of colour when reflected upon by the light in different positions. The next covering was an undressed deer skin, around which was rolled, in good order, a plain shroud manufactured after the same order as the one ornamented with feathers. This article resembled very much in its texture the bags generally used for the purpose of hold-

ing coffee exported from Havanna to the United States. The female had in her hand a fan formed of the tail feathers of a turkey. The points of these feathers were curiously bound by a buckskin string, well dressed, and were thus closely bound for about one inch from the points. About three inches from the point they were again bound, by another deer skin string, in such a manner that the fan might be closed and expanded at pleasure. * * *

The cave in which they were found, abounded in nitre, copperas, alum, and salts. The whole of this covering, with the baskets, was perfectly sound, without any marks of decay.[1]

There was also a scoop net made of bark thread; a mockasin made of the like materials; a mat of the same materials, enveloping human bones, were found in saltpetre dirt, six feet below the surface. The net and other things mouldered on being exposed to the sun.[2]

In the year 1815 a remarkably interesting set of mortuary fabrics was recovered from a saltpeter cave near Glasgow, Kentucky. A letter from Samuel L. Mitchell, published by the American Antiquarian Society, contains the following description of the condition of the human remains and of the nature of its coverings:

The outer envelope of the body is a deer skin, probably dried in the usual way, and perhaps softened before its application, by rubbing. The next covering is a deer skin, whose hair had been cut away by a sharp instrument, resembling a hatter's knife. The remnant of the hair, and the gashes in the skin, nearly resemble the sheared pelt of beaver. The next wrapper of cloth is made of twine doubled and twisted. But the thread does not appear to have been formed by the wheel, nor the web by the loom. The warp and filling seemed to have been crossed and knotted by an operation like that of the fabricks of the northwest coast, and of the Sandwich islands. * * * The innermost tegument is a mantle of cloth like the preceding; but furnished with large brown feathers, arranged and fastened with great art, so as to be capable of guarding the living wearer from wet and cold. The plumage is distinct and entire, and the whole bears a near similitude to the feathery cloaks now worn by the nations of the northwestern coast of America.[3]

The Bureau of Ethnology had the good fortune to secure recently a number of representative pieces of burial fabrics of the classes mentioned in the preceding extracts, and somewhat detailed descriptions of these will sufficiently illustrate the art as practiced by the early inhabitants of the middle portions of the country.

The relics which have come into the possession of the Bureau were obtained in 1885 by Mr. A. J. McGill from a rock shelter on "Clifty" or Cliff Creek, Morgan county, Tennessee. Mr. J. W. Emmert, through whom they were procured, reports that they were found in a grave 3½ feet below the surface and in earth strongly charged with niter and perhaps other preservative salts. The more pliable cloths, together with skeins of vegetal fiber, a dog's skull, some bone tools, and portions of human bones and hair, were rolled up in a large split-cane mat. The grave was situated about as shown in the accompanying section (figure 4). A shelf some 20 feet in width, with depressed floor, occurs

[1] Nat. and Abor. Hist. of Tenn., John Haywood. Nashville, 1823, pp. 163-165.

[2] Ibid., p. 62.

[3] Trans. and Coll. Amer. Antiq. Soc. Worcester, 1820, vol. I, pp. 318, 319.

MANTLE OR SKIRT OF LIGHT-COLORED STUFF.

about midway between the creek bed and the slightly overhanging ledge above, the whole height being estimated at 300 feet.

The mat, a very excellent piece of work, is 6 feet 6 inches by 3 feet 4 inches. By reference to plate II it will be seen that it is neatly and artistically made and quite well preserved. The strands are from one-third to three-sixteenths of an inch in width and are even on the edges and smoothly dressed on the back. The hard, glistening outer surface of the cane is light in color and the dressed surface is dark naturally or artificially, and the weaving is so managed that a tasteful border and a checkered effect are produced by alternately exposing the light and dark sides. This piece probably very fairly represents the split-cane work of the whole cane-producing region. A similar piece of work from the gulf coast is illustrated in figure 12.

FIG. 4.—Section of cliff showing position of grave shelter.

Inclosed with the mat were three pieces of fabric of especial interest, all pertaining, no doubt, to the costume of the person buried. The piece of cloth shown in plate III probably served as a mantle or skirt and is 46 inches long by 24 wide. It is of coarse, pliable, yellowish-gray stuff, woven in the twined style so common all over America. The fiber was doubtless derived from the native hemp, and the strands are neatly twisted and about the size of average wrapping cord. The warp strands, 24 inches in length, extend across the piece; and on the left margin, as seen in the illustration, they are looped for the passage of a gathering string, while on the left they have been cut to form a short fringe. The opposing series (the woof strands) have been passed through with the length of the cloth in pairs, which are twisted half around at each intersection, inclosing the web strands in alternating pairs as shown in detail in figure 5. These twined strands are placed three-eights of an inch apart, the web being so close that the fabric is but slightly open. The twined strands are carried back and forth in groups of four as shown at the ends in the plate, and are knotted as illustrated in the figure.

A piece of fabric of much interest is presented in plate IV. It may be an unfinished garment of the class shown in the preceding illustration, but it is more likely a complete skirt, the narrow woven band with its gathering string serving as a belt and the long fringe being the skirt. The length at the gathered edge is 34 inches, and the pendant length is 20 inches. The material and the weaving are the same as in the piece of cloth already described, although the work is somewhat coarser.

A detailed study of the border is given in figure 6, the vertical series of threads being pulled apart to show more distinctly the manner of combination.

The two pieces just described would seem to correspond pretty closely with the garments formerly worn by women and girls of the lower Mis-

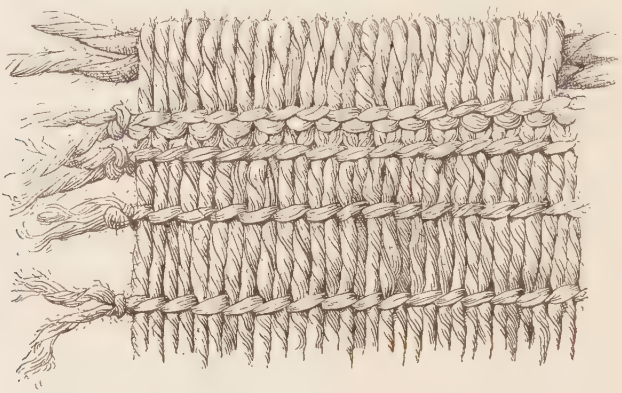


FIG. 5.—Portion of mantle showing manner of weaving.

sissippi country, as illustrated by Du Pratz in a plate facing page 310, volume II, of his Histoire de la Louisiane. His plate is reproduced in figure 7. The following are translations of his descriptions of the garments delineated:

The women in warm weather have only a half ell of limbourg, with which they are covered; they fold this cloth around the body and are well clothed from the

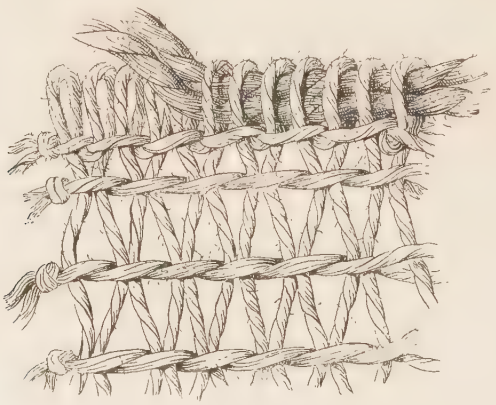


FIG. 6.—Analysis of the weaving of fringed skirt. Threads natural size.

waist to the knees; when they have no limbourg they use in the same way a deer skin. * * *[1].

When the girls reach the age of eight or nine years they are clothed from the waist to the ankles with a fringe of threads of mulberry bark, fastened to a band

[1] Histoire de la Louisiane. Du Pratz. Paris, 1758, vol. II, p. 191.

FRINGED SKIRT.

which is attached below the abdomen; there is also another band above the abdomen which meets the first at the back; between the two the body is covered in front by a network which is held there by the bands, and at the back there are merely two large cords, each having a tassel.[1]

Of equal interest to the preceding is the badly frayed bag shown in plate v. It is 20 inches in length and 13 inches in depth. The style

FIG. 7.—Former costumes of woman and girl in Louisiana (after Du Pratz).

of weaving is the same as that of the two preceding examples; a peculiar open effect is produced by the rotting out of certain strands of dark color, which were arranged in pairs alternating with eight lighter threads. The construction of the border or rim of this bag is quite remarkable. As shown in figure 8, the upper ends of the vertical

[1] Histoire de la Louisiane, Du Pratz. Paris, 1758, vol. II, p. 193.

strands are gathered in slightly twisted groups of four and carried up free for about two inches, when they are brought together and plaited with remarkable neatness into a string border. As if to convey to the curious investigator of modern times a complete knowledge of their weavers' art, the friends of the dead deposited with the body not only the fabrics worn during life but a number of skeins of the fiber from which the fabrics were probably made. This fiber has been identified as that of the *Cannabis sativa*, or wild hemp. Two of the skeins are shown in plate v.

The presence of these unworked materials makes it probable that the individual burned was a female, for the distaff and the loom have been and are universal emblems of the practical enslavement of that sex.

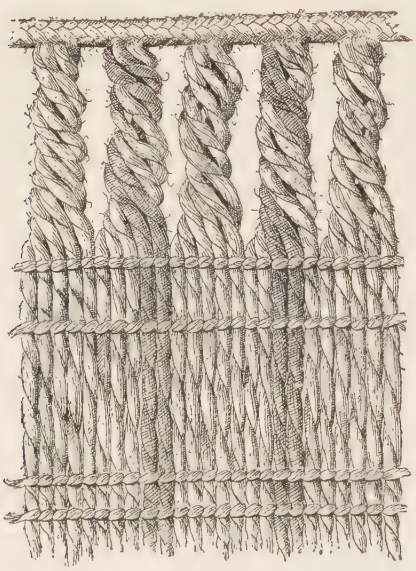
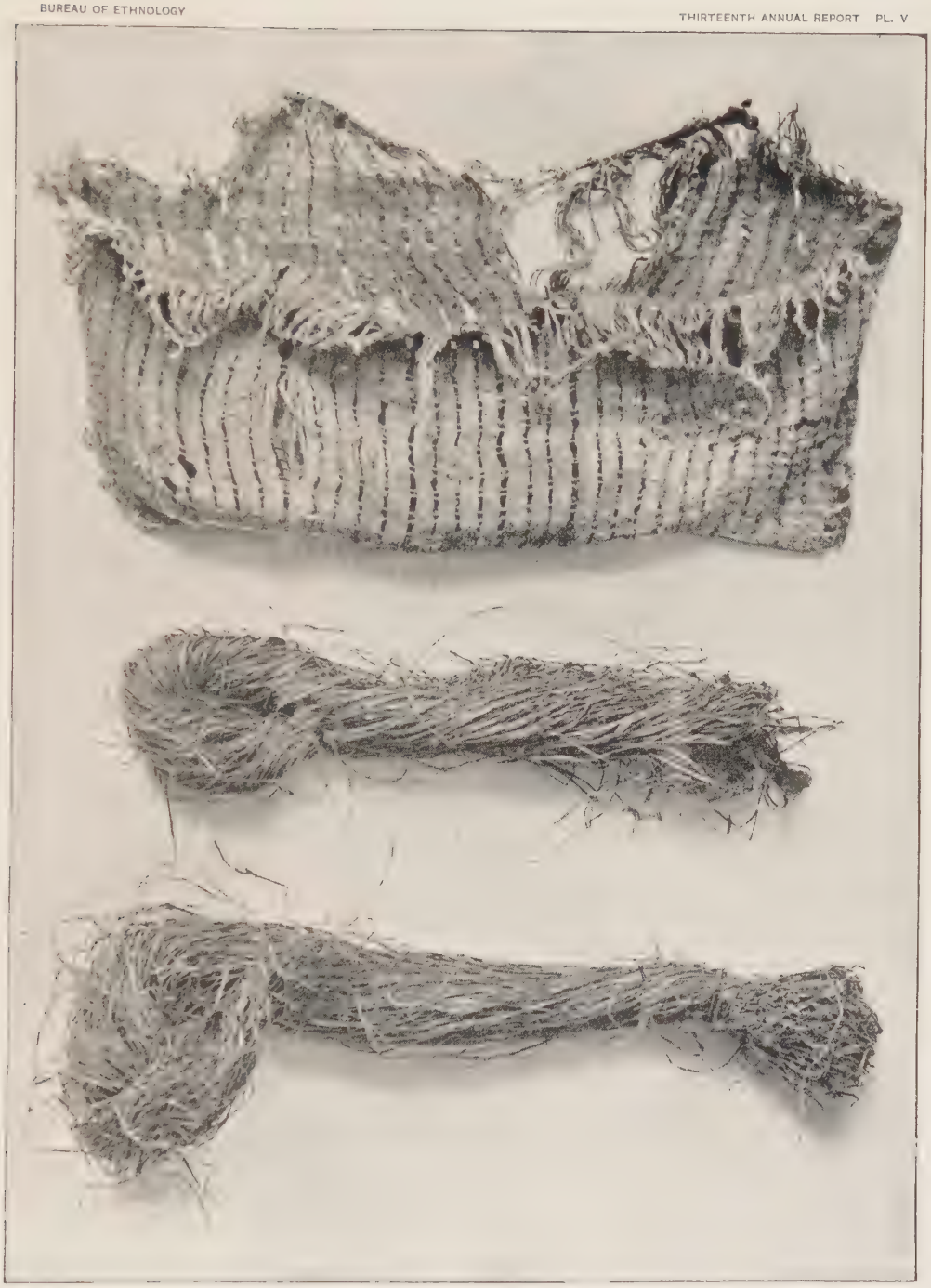


FIG. 8.—Border of bag.

A small but very instructive group of burial fabrics is preserved in the National Museum. These specimens were found with a desiccated body in 1877 in a cave 8 miles from Mammoth cave, Kentucky. They consist of a number of bags and other articles woven in the usual styles of bast and hemp. Nearly all of the articles are worn or fragmentary, but the fiber is wonderfully preserved and the original colors are as fresh as if the burial had taken place but yesterday. There are three wide-mouthed, shallow bags, resembling the one from Tennessee illustrated in plate v. The largest is 34 inches long when closed, and 15 inches deep. Both web and woof are of bast. There is a border of open work bound by a plaited band as seen in figure 8, and the manner of weaving is identical with that shown in that figure. The second bag is 22 inches long and 16 deep. The web is of bast, the woof of hemp. The smaller specimen is 14 by 9 inches and is made exclusively of hemp, and is thus much more pliable than the others. The small remnant of a larger bag shows a web of heavy, plaited bast strands resembling the specimen impressed on pottery and shown in *a*, plate IX. Besides these pieces there is a bit of heavy, compactly woven stuff, resembling the broad part of a sling, which shows traces of a geometric pattern, and a piece of flattish rope 12 feet long and 12 inches broad plaited very neatly of hempen twine.

Among a number of cave relics from Kentucky donated to the Museum by Mr. Francis Klett, are some textile articles. Among these is a sandal or moccasin woven or plaited very neatly of bast. It is shown in



FRAYED BAG AND SKEINS OF HEMP FIBER.

figure 9. Prof. F. W. Putnam and other explorers of these caves have obtained numerous textile articles of interest.

Charred Remains of Fabrics from Mounds.

That the well-preserved fabrics just illustrated represent fairly the textile work of the mound-builders is practically demonstrated by the evidence furnished by the mounds themselves. From hundreds of sources come the same story; and it is not necessary here to enter into any elaborate discussion of the subject or to multiply illustrations. I present in plates VI and VII specimens of mound fabrics which, since they were burned with the dead, undoubtedly formed part of the clothing of the living or were wrappings of articles deposited with the bodies. These coarse cloths may be considered as fairly representing the weaving of the mound-builders. There are among them some finer examples of weaving than those obtained from the caves and shelters of Tennessee and Kentucky, but there is nothing specifically different in material or methods of combination, and there is nothing what-

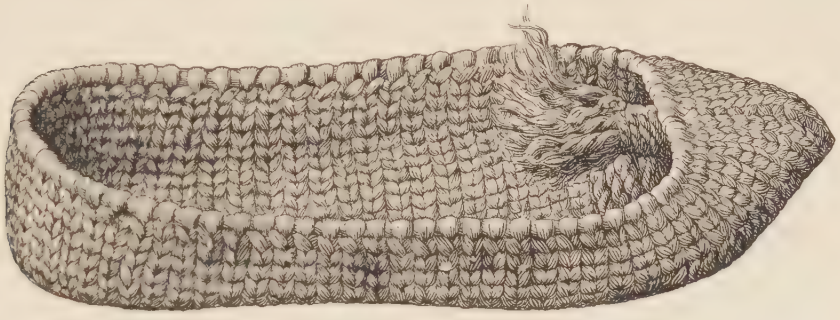


Fig. 9.—Sandal or moccasin from a Kentucky cave.

ever to suggest a higher stage of culture than that of the historic Indian.

The fiber is quite fine and is more probably of hemp than of the bark of trees. The strands are generally well twisted and even, the twist being in most cases to the right, or as if twisted on the thigh with a downward movement of the right-hand, the thread being held in the left. As in the case of cave fabrics as well as the work of the modern peoples of the region, the weaving is nearly all in the twined style, of which there are two varieties; one in which each strand of the web is in turn inclosed simply by the woof twisted in pairs, and the other in which alternate pairs of the web strands are inclosed by the twined pairs of the woof. Cloths woven in the first method are often quite close, as the woof threads are readily pressed or pounded down on one another entirely hiding the web strands, giving a fabric of much compactness and strength. The second variety is usually some-

what open and net-like, and very often the pairs of twined woof strands are placed far apart, as shown in several of the illustrations given in this paper. The finest mesh observed is in the first of these styles, and includes about twenty intersections to the inch.

From the Ohio mounds also there are examples of plain as well as of diagonal interlacing. In appearance the cloth is much the same as that done in the twined style. In a few cases a border or selvage of very simple construction is seen. A looped margin for the passage of a gathering cord is common.

In plate VI a number of bits of charred cloth are shown; being quite black the camera fails to give them with clearness, but the drawings presented in plate VII serve to make clear all details of the strands and their combination. The charring has taken place in cremating the dead, in the burning of offerings or through accidental subjection to heat. In some cases very considerable portions of the cloth are found, but it is usually in a very fragile state and little has been preserved.

Specimens preserved in this way are obtained from a large area, including the Ohio and a large portion of the Mississippi valleys.

Fabrics Preserved by Contact with Copper.

The preservation of woven textures through association in burials with implements or other articles of copper is of common occurrence. Our museums contain many examples of copper celts retaining on their surfaces portions of cloth so well preserved that the fibers retain much of their original strength as well as color. In plate VIII three examples are shown from a mound near Davenport, Iowa, and a fourth from a mound near Savannah, Georgia. The fabrics on *a* and *b* are of the twined style and, although occurring 800 miles apart, are identical in every respect. The cloth on *c* is very closely woven and has the appearance of simple interlacing. The finest piece of work that has come to my notice is a bit of cloth from a mound in Pike county, Ohio. It has from thirty-five to forty strands to the inch, and looks much like coarse twilled goods. It is woven in the twined style, however, and is therefore of native origin. It was preserved by contact with a large number of copper beads, four of which are shown in the cut, figure 10.

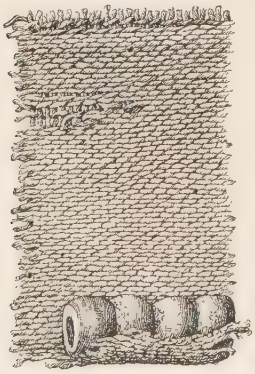
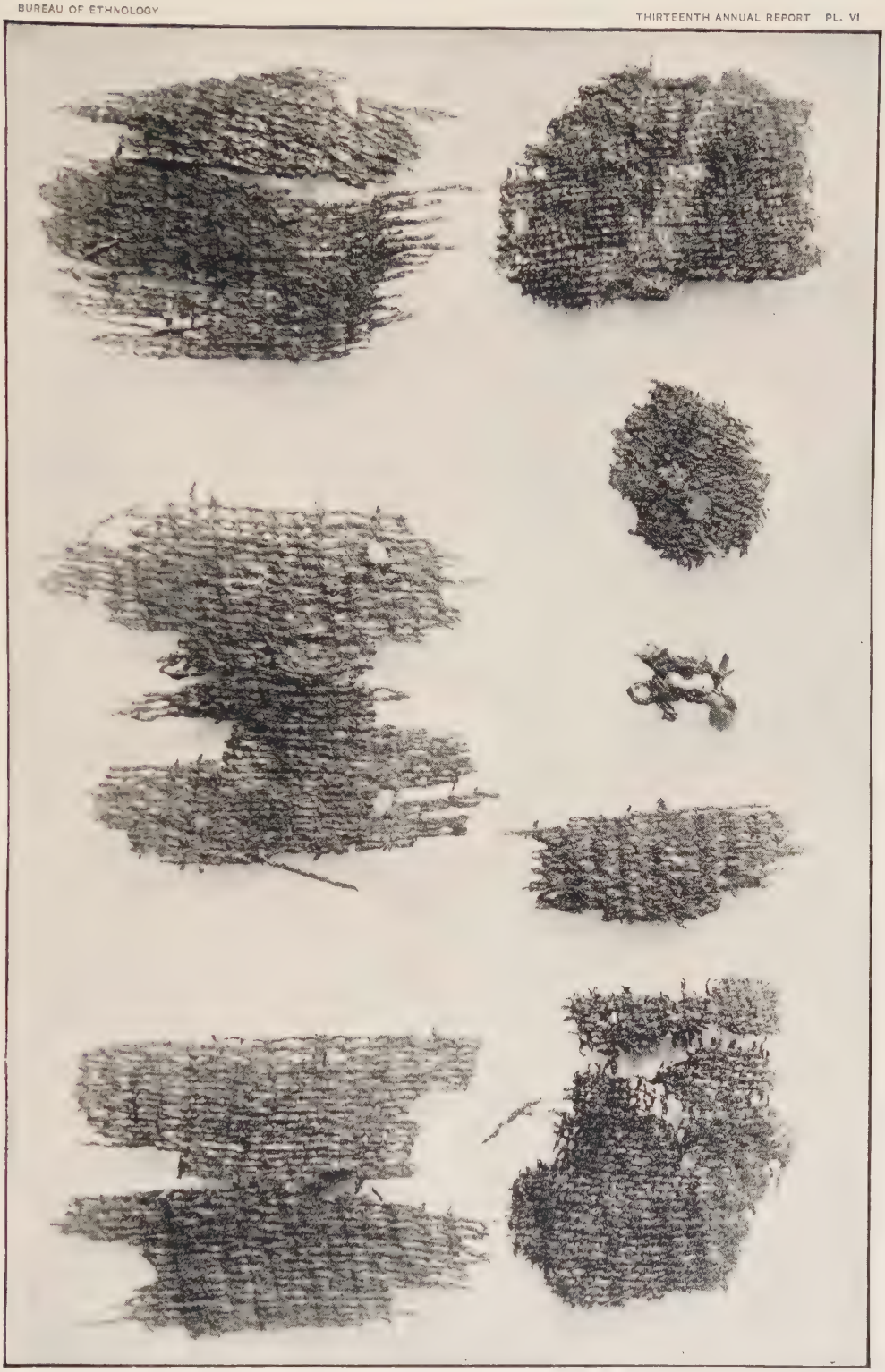


Fig. 10.—Fine, closely woven cloth preserved by contact with copper beads.

Traces of basketry are rarely preserved either by charring or by contact with copper. Matting is occasionally preserved in these ways. Figure 11 illustrates a piece of rush matting found fixed to the surface of a bit of copper in a mound near Augusta, Georgia.

The weaving of the hair of many species of quadrupeds, the buffalo, the opossum, the rabbit, etc., is noted by a number of authors, and a few



CHARRED CLOTH FROM MOUNDS IN OHIO.

specimens of haircloth have been recovered from mounds. Mr. Henry R. Howland found in a mound near Alton, Illinois, two varieties of cloth preserved by contact with a copper ornament representing a turtle-shell; they are described as follows:

> Closely fitting over the outer surface of the copper shell is, first, a woven cloth of a vegetable fibre, similar in its general character to the outer matting above described, but of a stronger and better preserved fibre, apparently more like that which forms the woven coating of the Davenport axes. This is covered in turn with a softer, finer fabric, now of a dark-brown color, formed of twisted strands, laid or matted closely together, though apparently not woven. The material of which these strands are formed proves, under microscopic examination, to be animal hair.[1]

An illustration of ancient split cane matting is presented in figure 12. The specimen was obtained from Petite Anse island, near Vermilion bay, southern coast of Louisiana, and a photograph was presented to the Smithsonian Institution in 1866, by J. F. Cleu. The following description, as given by Prof. Joseph Henry, appears on the label attached to the specimen:

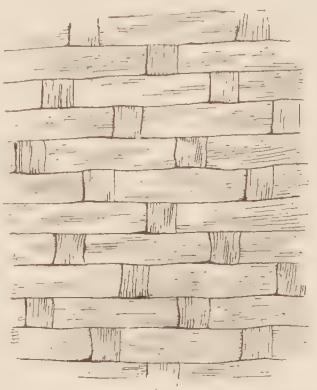


FIG. 11.—Small portion of rush matting preserved by contact with copper.

> This fragment of matting was found near the surface of the salt, and about 2 feet above it were remains of tusks and bones of a fossil elephant. The peculiar interest in regard to the specimen is in its occurrence in situ 2 feet below the elephant remains, and about 14 feet below the surface of the soil, thus showing the existence of man on the island prior to the deposit in the soil of the fossil elephant. The material consists of the outer bark of the common southern cane (*Arundinaria macrosperma*), and has been preserved for so long a period both by its silicious character and the strongly saline condition of the soil.

FABRICS IMPRESSED ON POTTERY.

It was a common practice among the aborigines to employ woven fabrics in the construction and ornamentation of earthenware. Impressions were thus left on the clay, and by baking these were rendered as lasting as if engraved on stone.

From no other source do we obtain so wide a range of fabrics. The fabric-marked vases and sherds are obtained from mounds, graves, and village sites all over the country. There is not a state within the Mississippi or Atlantic drainage that does not furnish some example of the preservation of native fabric impressions on earthenware. The perfection with which every character of these textures is preserved is well shown in a number of the figures here introduced.

A somewhat extended study of this subject was published in the Third Annual Report of the Bureau of Ethnology, and illustrations of nearly all the styles of weaving were given. As indicated by subse-

[1] Recent Archæological Discoveries in the American Bottom. Bulletin of the Buffalo Society of Natural Sciences, March 2, 1877, p. 208.

quent investigations, a number of slight inaccuracies of analysis and drawing occur in that paper, but they are of such minor importance that detailed correction is unnecessary.

It would seem that imprints of cloth woven in the plain interlaced style appear to be quite rare, although it is difficult, from the impressions on clay, to distinguish this from other forms when the threads are closely impacted. In somewhat rare cases the interlacing is so arranged and alternated as to give diagonal effects as in a specimen

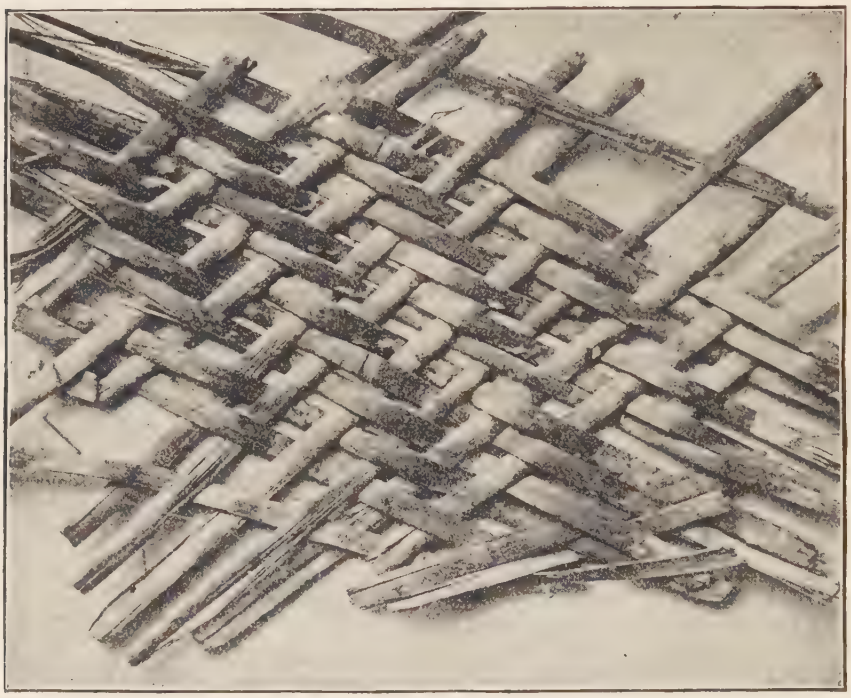
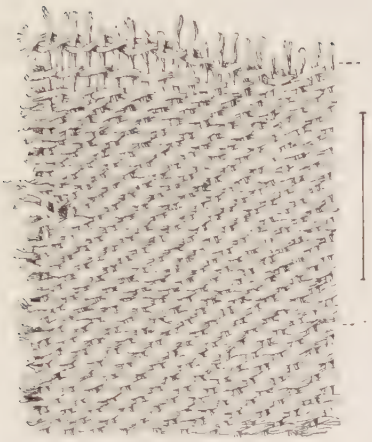


FIG. 12.—Split cane matting from Petite Anse island, Louisiana.

shown in figure 13. These effects are peculiar to the interlaced fabrics, not being produced in twined or netted work.

It has been supposed that vessels of clay were often modeled in baskets, and that the native earthenware preserved numerous impressions of baskets. On closer analysis these impressions turn out to be the application of pliable cloths, or of cords singly or in groups, or of stamps covered with textiles or having geometric textile-like patterns engraved on them. I can not recall a single example from eastern United States in which it is entirely clear that the clay vessel was modeled in a basket. The impressions of basket work occasionally seen are only partial, having been applied after the vessel was practically finished.

I present in figure 13, a small earthen vessel from a mound in North Carolina, the entire exterior surface of which is marked with a fabric,



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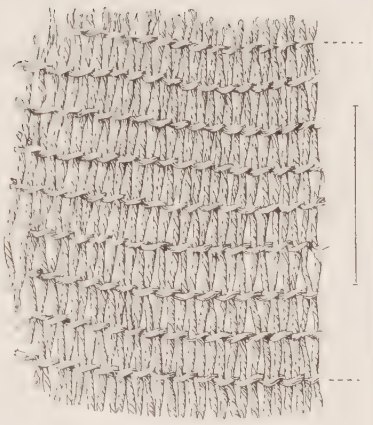

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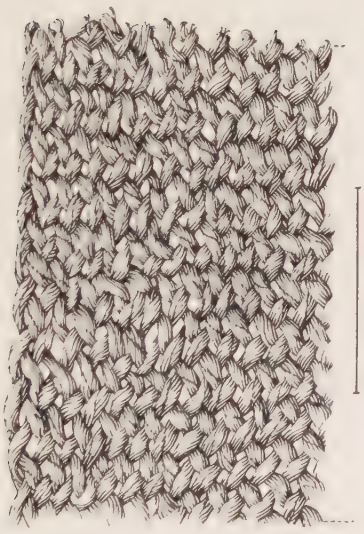

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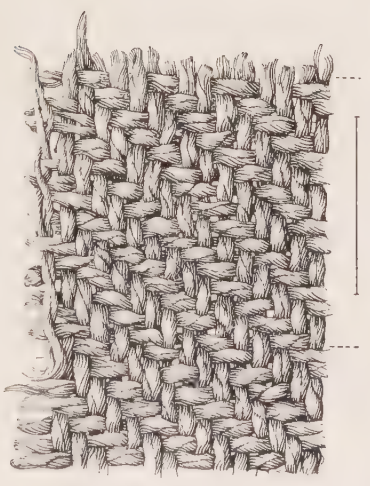


d

DRAWINGS OF CHARRED FABRIC FROM MOUNDS.

a pliable cloth or bag woven in the twined styled. The impressions are not the result of a single application of the texture, but consist of several disconnected imprintings as if the hand or a paddle covered with cloth had been used in handling the vessel or in imparting a desired finish to the surface.

FIG. 13.—Fabric marked vase from a mound in North Carolina.

Specimens of diagonal fabrics, restored from potsherds, are given in figures 14 and 15. The first is a very neatly woven diagonal from the ancient pottery of Polk county, Tennessee. Two series of cords have been interwoven at right angles to each other, but so arranged as to produce the diagonal effect. One series of the cords is fine and well

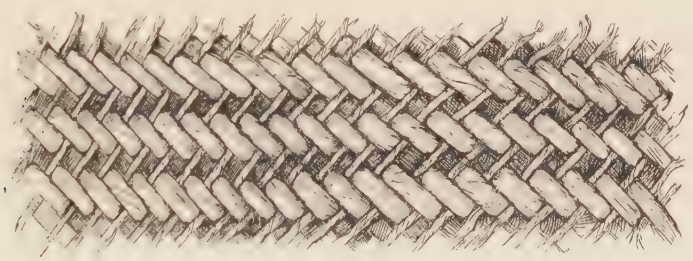


FIG. 14.—Diagonal fabric, ancient pottery of Tennessee.

twisted, the other coarser and very slightly twisted. The second is a piece of matting restored from the impression on a small piece of pottery collected in Alabama. It was probably made of rushes or heavy blades of grass.

Twined weaving prevails in the fabrics impressed on pottery as in those from all other aboriginal sources. An example of the simplest

form, obtained from a small fragment of pottery found in Polk county, Tennessee, is shown in figure 16. Two series of threads are interwoven at right angles, the warp being arranged in pairs and the woof singly.

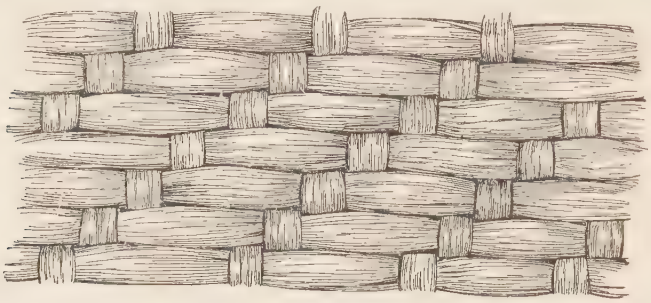


FIG. 15.—Fabric from the ancient pottery of Alabama.

At each intersection the pairs of warp threads are twisted half around upon themselves, inclosing the woof threads and holding them quite

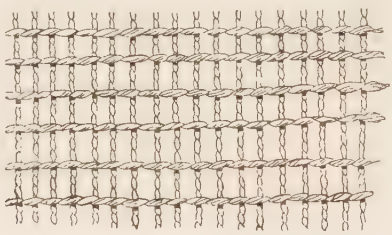


FIG. 16.—Twined fabric from ancient pottery, Tennessee.

firmly, so that the open net-like effect is well preserved even under strain or in long continued use. There are many varieties of this form

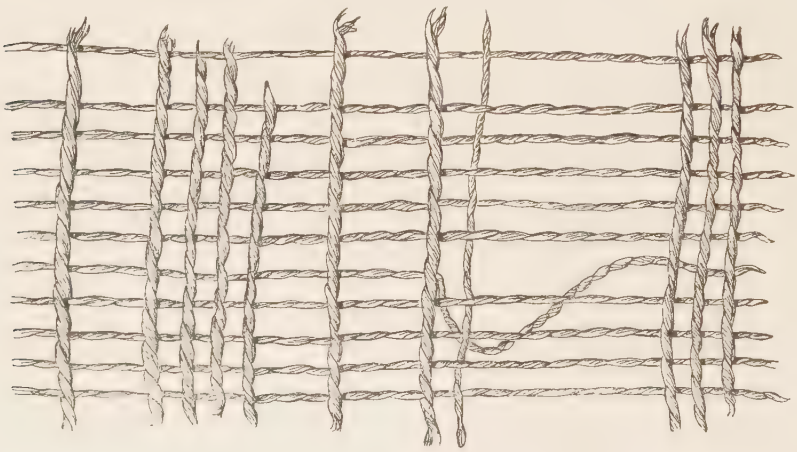


FIG. 17.—Twined fabric from ancient pottery, Tennessee.

of fabric resulting from differences in size and spacing of the threads. These differences are well brought out in the succeeding figures.

In figure 17 we have a characteristic example of this fabric, obtained from a fragment of pottery from a mound at Sevierville, Tennessee.

COPPER CELTS WITH REMNANTS OF CLOTH.

The impression is quite perfect. The cords are somewhat uneven, and seem to have been only moderately well twisted. They were probably made of hemp fiber. It will be observed that the threads of the web are placed at regular intervals, while those of the woof are irregularly placed. It may be noticed that in one case the woof has not been doubled, the single thread having, as a consequence, exactly the same relation to the opposing series as corresponding threads in simple inter-

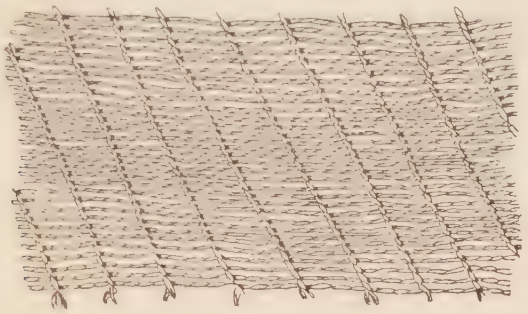


FIG. 18.—Twined fabric from ancient salt vessel, Illinois.

lacing. The impression, of which this is only a part, indicates that the cloth used in shaping the vessel was considerably distorted when applied to the soft clay.

Nowhere else are found so many fine impressions of fabrics on clay vessels as in the ancient salt-making localities of the Mississippi valley. The huge bowls or vats used by the primitive salt-maker have generally been modeled in coarse, open fabrics, or have had cloths impressed

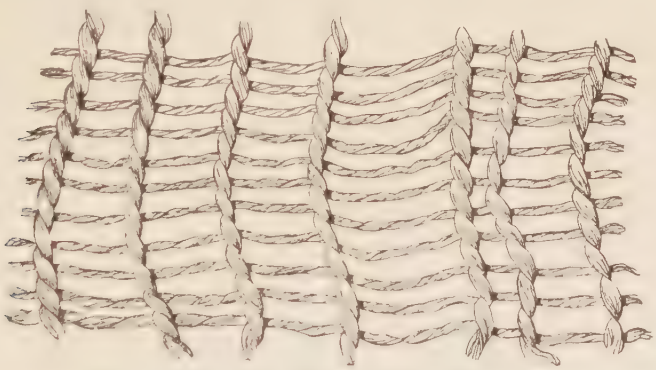


FIG. 19.—Twined fabric from ancient salt vessel, Illinois.

upon them for ornament. In figures 18 and 19 fine examples of these impressions are given. The latter engraving illustrates a specimen in which every detail is perfectly preserved. Only a small portion of the original is shown in the cut. It is noticeable that the cords are quite heavy and well twisted, although the spacing is somewhat irregular.

The example given in figure 20, impressed on a fragment of clay from Arkansas, has an ornamental border produced by looping the cords of

FIG. 20.—Twined fabric from a piece of clay, Arkansas.

the web, which seem to have been five in number, each one passing over four others before recrossing the frame. A specimen showing a somewhat different border is given in figure 21.

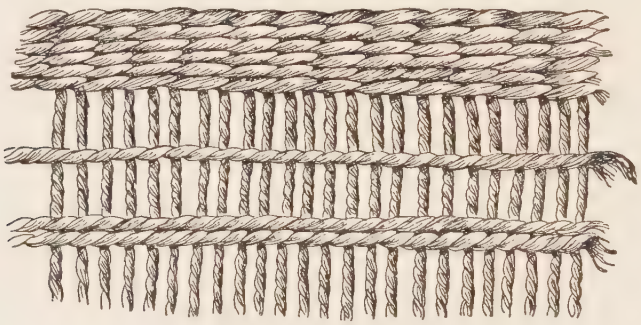


FIG. 21.—Twined fabric from ancient pottery, Tennessee.

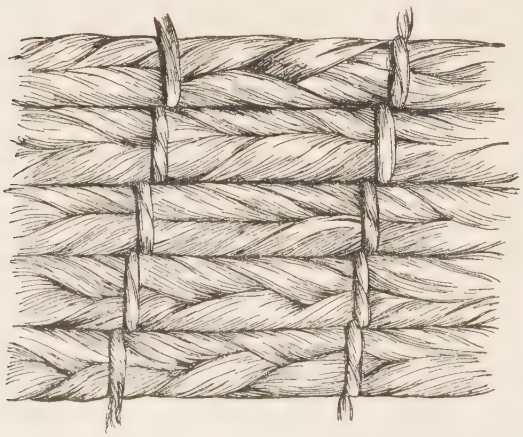


FIG. 22.—Twined fabric from ancient pottery, Missouri.

The interesting specimen illustrated in figure 22 was obtained from a small fragment of pottery found in Ripley county, Missouri. The

combination of the two series of strands clearly indicates the type of fabric, the twisted cords of the woof being placed very far apart. The warp is of braid formed by plaiting strands of untwisted fiber, probably bast. All the details are shown in the most satisfactory manner in the clay cast.

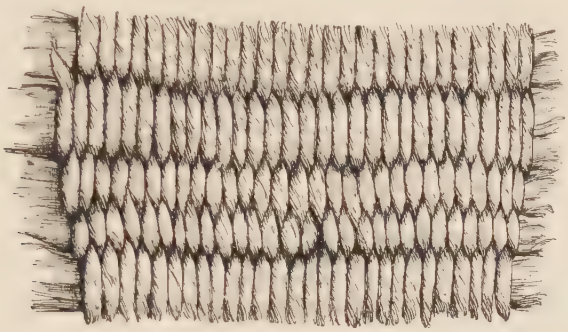


FIG. 23.—Twined fabric from ancient pottery, Carter county, Tennessee.

In figure 23 we have a similar fabric closely woven or impacted. I have made the drawing to show fillets of fiber appearing at the ends; these do not appear in the impression. It is highly probable, however,

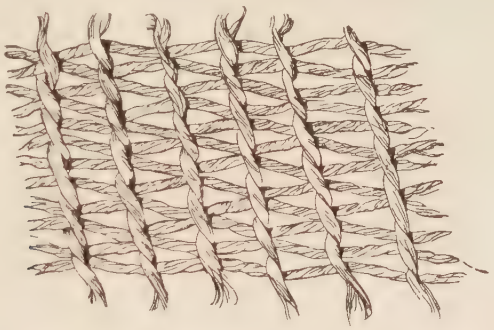


FIG. 24.—Twined fabric from ancient pottery, Tennessee.

that these fillets are plaited bands, as in the preceding example. They are wide and flat, giving somewhat the effect of basket-work of splints or rushes.

FIG. 25.—Twined fabric from ancient pottery, Tennessee.

Another variety of the twined fabrics, distinguished by peculiarities in the combinations of the threads, is illustrated in figures 24 and 25. The threads of the warp are arranged in pairs as in the specimens

already described, but are twisted in such a way as to inclose two of the opposing series instead of one, each succeeding pair of warp threads taking up alternate pairs of the woof threads. Figure 25 is from a

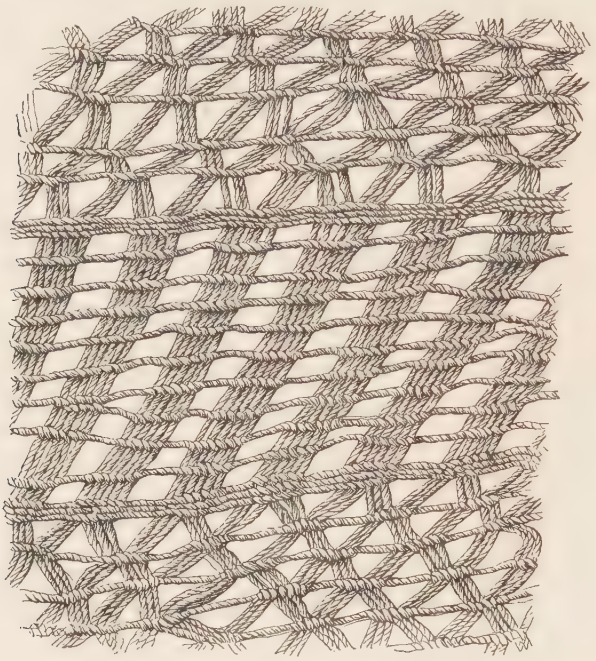


FIG. 26. -Twined fabric, with patterns, Ohio valley.

small piece of pottery exhumed from a mound on Fain island, Jefferson county, Tennessee. The threads of the woof are quite close together, those of the web being far apart.

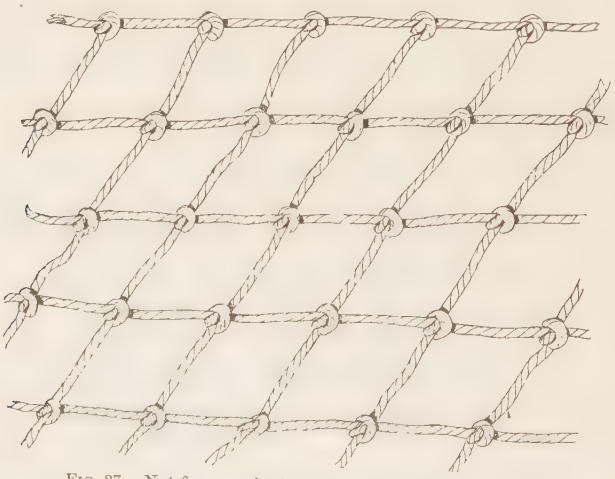
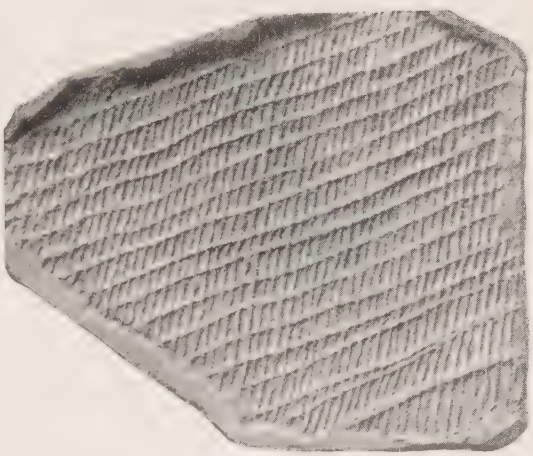


FIG. 27.—Net from ancient pottery, District of Columbia.

That the native love of decoration had a marked influence on the weavers' art in its simplest and rudest as well as higher forms is well



BITS OF FABRIC-MARKED POTTERY, WITH CLAY CASTS OF SAME

evinced even in the meager vestiges brought to light by researches in the mounds. Decorative borders and fanciful combinations of strands are shown in some of the preceding cuts, and figure 26, copied from a pottery fragment obtained in the Ohio valley, indicates a more ambitious attempt at embellishment. The fabric was evidently of ornate design and the execution excellent.

Plate IX is intended to convey a clear notion of the nature and appearance of fabric-marked pottery and of the manner of securing positive impressions in clay. Three bits of pottery from Illinois are placed at the left, and the three casts appear at the right. All illustrate open fabrics of comparatively simple pattern done in the characteristic twined style.

Nets were in use by the Indians of Florida and Virginia at the time of the discovery, and the ancient pottery of the Atlantic states has preserved impressions of innumerable specimens. The piece shown in figure 27 is from a small fragment of pottery picked up in the District of Columbia. The impression is so perfect that the twist of the cord and the form of the knot may be seen with ease. Most of the examples from this locality are of much finer cord and have a less open mesh than

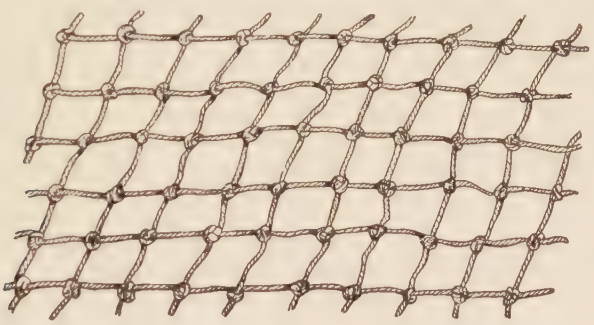


FIG. 28.—Net from ancient pottery, North Carolina.

the specimen illustrated. The net illustrated in figure 28 is from a specimen of North Carolina pottery. Netting of this class was still in use among the natives of the Chesapeake region when the English colonies were founded.

The lesson of the prehistoric textile art of eastern United States is simple and easily read, and goes far to round out the story of native occupation and culture. Colonial records furnish definite knowledge of the woven fabrics and weaving of the nations first encountered by the whites. Graves, mounds, and caves give us an insight into the pre-Columbian status of the art, and evidence furnished by associated industries which happen to echo features of the textile art contribute to our information. Charred cloths from the great mounds are identical in material, combination of parts, and texture with the

fabrics of the simple savage. Cloths preserved by contact with copper implements and ornaments characteristic of the art of the builders of the mounds do not differ in any way from the humble work of the historic peoples. All tell the same story of a simple, primitive culture, hardly advanced beyond the grade separating the savage from the barbarous condition.

STONE ART

BY

GERARD FOWKE

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STONE ART

By Gerard Fowke

INTRODUCTION.

Basis for the Work.

The collection of the Bureau of Ethnology includes almost every type of stone implement or ornament, and as the investigations and explorations of the collaborators have extended over nearly all the eastern and central portions of the Mississippi valley, it furnishes a substantial basis for showing the geographic distribution of various forms of objects in use among the aboriginal inhabitants.

It has not been deemed advisable to utilize material contained in other collections. Should this be done there would be no reason for drawing upon one rather than another, and if it were once begun the examination would finally extend to every collection made from American localities, a study which, although perhaps desirable, would transcend the scope of the Bureau plans.

Much that has been published in regard to the distribution of relics in various portions of the country is of little value to a paper of this kind, since few of the objects are sufficiently illustrated or referred to any class in other than the most general terms; so that it is frequently impossible to determine the group in which a given article should be placed. Partly for this reason, partly because the primary purpose is description of a certain collection made in a definite way, little space is given to the descriptive work of predecessors in the field of archeology. The general results of previous work are, however, carefully weighed in the conclusions reached.

Classification of Objects and Materials.

The ordinary division into chipped and pecked or ground implements has been adopted: the former including all such as are more easily worked by flaking, and the latter including those made from stone suitable for working down by pecking into form with stone hammers or by similar means. The system of nomenclature in general use has been retained, as it is now familiar to students of North American

archeology, and, while not entirely satisfactory in some respects, is perhaps as good as can be devised in the present state of knowledge.

Careful study of the entire collection has failed to show the slightest difference in the form, finish, or material of implements from the same locality, whether found in mounds or graves or on the surface; hence no attempt is made to separate the two classes of objects. Allowance is to be made for the weathering of a surface specimen, but this is the only distinction.

It is not always easy to identify a stone, even with a fresh surface; in a weathered specimen it is often impossible. For this reason the material of which a specimen is made may not be correctly named; frequently the alteration due to exposure will change the appearance of a rock very much, and in such a case the best that can be done is to tell what it looks most like. The material of a majority of specimens however, or at least the classes of rock to which they belong, as granite, porphyry, etc., are correctly named; to give a more exact name would be possible only by the destruction or injury of the specimen. There are a few terms used which may be here explained.

"Compact quartzite" is a very hard, close-grained, siliceous rock, sometimes nearly a flint, and again closely approaching novaculite. "Greenstone" may be diorite or diabase, or it may be a very compact dark sandstone or quartzite so weathered that its nature can not be determined from superficial observation. "Argillite" refers to any slaty rock; it may be so soft as to be easily cut with a knife, or nearly as hard as quartzite. Usually it is greenish in color.

A comprehensive study of all available collections will no doubt modify materially the classification and system of types here presented.

The quotations from eminent anthropologists given below show the difficulties in the way of establishing a satisfactory system of types, or of assigning certain forms to particular localities. In most of these quotations the substance only of the author's remarks is given.

According to Dr. E. B. Tylor, the flint arrows of the Dakota, the Apache, or the Comanche might easily be mistaken for the weapons dug up on the banks of the Thames;[1] while cores of flint in Scandinavia and of obsidian in Mexico are exactly alike,[2] and a tray filled with European arrowheads can not be distinguished from a tray of American ones.[3] Prof. Otis T. Mason observes that the great variety of form in such weapons after they are finished is due partly to nature and partly to the workman's desire to produce a certain kind of implement. All sorts of pebbles lie at the hand of the savage mechanic, none of them just what he wants. He selects the best.[4] Perhaps the truth about the shape is that the savage found it thus and let it so remain.[5]

[1] Anahuac, p. 101.
[2] Ibid., p. 98.
[3] Dawson, Sir William; Fossil Men, p. 121.
[4] Smithsonian Report for 1884, p. 741.
[5] Ibid., p. 748.

The state of things among the lower tribes which presents itself to the student is a substantial similarity in knowledge, arts, and customs, running through the whole world. Not that the whole culture of all tribes is alike—far from it; but if any art or custom belonging to a low tribe is selected at random, the likelihood is that something substantially like it may be found in at least one place thousands of miles off, though it frequently happens that there are large intervening areas where it has not been observed.[1]

On the whole, it seems most probable that many of the simpler weapons, implements, etc., have been invented independently by various savage tribes. Though they are remarkably similar, they are at the same time curiously different. The necessaries of life are simple and similar all over the world. The materials with which men have to deal are also very much alike; wood, bone, and to a certain extent stone, have everywhere the same properties. The obsidian flakes of the Aztecs resemble the flint flakes of our ancestors, not so much because the ancient Briton resembled the Aztec, as because the fracture of flint is like that of obsidian. So also the pointed bones used as awls are necessarily similar all over the world. Similarity exists, in fact, rather in the raw material than in the manufactured article, and some even of the simplest implements of stone are very different among different races.[2]

Tylor again says:

When, however, their full value has been given to the differences in the productions of the Ground Stone Age, there remains a residue of a most remarkable kind. In the first place, a very small number of classes, flakes, knives, scrapers, spear and arrow heads, celts, and hammers take in the great mass of specimens in museums; and in the second place, the prevailing character of these implements, whether modern or thousands of years old, whether found on this side of the world or on the other, is a marked uniformity. The ethnographer who has studied the stone implements of Europe, Asia, North or South America, or Polynesia, may consider the specimens from the district he has studied as types from which those of other districts differ, as a class, by the presence or absence of a few peculiar instruments, and individually in more or less important details of shape or finish, unless, as sometimes happens, they do not differ perceptibly at all. So great is this uniformity in the stone implements of different places and times, that it goes far to neutralize their value as distinctive of different races. It is clear that no great help in tracing the minute history of the growth and migration of tribes is to be got from an arrowhead which might have come from Polynesia, or Siberia, or the Isle of Man, or from a celt which might be, for all its appearance shows, Mexican, Irish, or Tahitian. If an observer, tolerably acquainted with stone implements, had an unticketed collection placed before him, the largeness of the number of specimens which he would not confidently assign, by mere inspection, to their proper countries, would serve as a fair measure of their general uniformity. Even when aided by mineralogical knowledge, often a great help, he would have to leave a large fraction of the whole in an unclassified heap, confessing that he did not know within thousands of miles or thousands of years where and when they were made.

How, then, is this remarkable uniformity to be explained? The principle that man does the same thing under the same circumstances will account for much, but

[1] Tylor; Early History of Mankind, p. 169.
[2] Lubbock, Sir John; Prehistoric Times, p. 569.

it is very doubtful whether it can be stretched far enough to account for even the greater proportion of the facts in question. The other side of the argument is, of course, that resemblance is due to connection, and the truth is made up of the two, though in what proportion we do not know.[1]

While the several authors quoted do not fully agree, and some are even slightly self-contradictory, still, if the statements are to be taken at their face value, it would seem that efforts to make such classifications are mainly a waste of time.

It may be premised that in every class of implements there are almost as many forms as specimens, if every variation in size or pattern is to be considered; and these merge into one another imperceptibly. Not only is this the case with individual types, but the classes themselves, totally unlike as their more pronounced forms may be, gradually approach one another until there is found a medium type whose place can not be definitely fixed.

THE ARTS AND THEIR DISTRIBUTION.

Districts.

As space would be needlessly occupied by attempting to name each county, the area from which specimens have been obtained is, for convenience, divided into districts. These divisions are for use in this article only, and are not intended as archeologic districts.

In the tables given under each heading, the names of counties or districts show where the types described are obtained; the columns following show the number of specimens of each material mentioned in the collection of the Bureau.

Where a limited area only has been examined in any division, the name of the county is usually given; but where specimens of any kind have been obtained from different counties near one another, they are assigned to the district including those counties. The districts are as follows:

Arkansas.

Northeastern: Between White and Mississippi rivers.
Southeastern: Between White and Washita rivers from Clarendon to Arkadelphia.
Southwestern: West of Washita river and south of Arkadelphia, including Bowie and Red River counties, Texas.
Central: From Dardanelles southward and eastward to the above limits.

Alabama.

Northeastern: Bordering Tennessee river east of Decatur.
Northwestern: Bordering Tennessee river west of Decatur.

[1] Early History of Mankind, p. 203.

Coosa: Bordering Coosa river southward to and including Dallas county.

Tuscaloosa: Bordering the Tuscaloosa and Little Tombigbee, and extending a short distance below their confluence.

Ohio.

Miami valley: The country along the two Miami rivers, including Shelby county on the north and Madison and Brown counties on the east.

Scioto valley: South of Franklin county, including Adams and Lawrence counties.

Central: Including Union, Knox, Perry, and Franklin counties, and the area within these limits.

Wisconsin.

Southwestern: The counties bordering on either side of Mississippi river from La Crosse to Dubuque (Iowa).

Eastern: The portion between Lake Michigan, Lake Winnebago, and the Illinois line.

Southern: Dane and adjoining counties.

Iowa.

Keokuk: The southeastern corner of the state and adjacent portions of Illinois and Missouri.

Tennessee.

Eastern: All the mountain district, with the extreme southwestern part of Virginia.

Western: From Mississippi river to and including the tier of counties east of the Tennessee.

Northern: The northern half of the interior portion.

Southern: The southern half of this portion.

South Carolina.

Northwestern: North and west of a line from Lancaster to Columbia. As no other portion of the state has been examined under direction of the Bureau, only the name of the state is used herein, reference being always to this section.

Georgia.

Northwestern: The portion northwest of the Chattahoochee.

Southwestern: Area contiguous to the lower Chattahoochee and Flint river.

Savannah: The vicinity of the city of Savannah, where a large collection was gathered.

Kentucky.

Northeastern: Between Kentucky, Big Sandy, and Ohio rivers.
Southeastern: From Estill and Cumberland counties to the Tennessee and Virginia state lines.
Central: Between Green and Ohio rivers, west of the last described districts.
Southern: From Green river southward and as far westward as Christian county.
Western: West of Green river and Christian county.

North Carolina.

Western: West of Charlotte.
Central: Between Charlotte and Raleigh.

Illinois.

Southwestern: From the mouth of the Cumberland to Washington county, and thence to the Mississippi.

Descriptive Terms.

The various forms of implements will now be considered. As stated above, the names given the various articles are those by which they are usually known; but it may be well to define some of the terms used.

In the grooved axes, *edge* refers to the cutting portion; *blade*, to the part below the groove; *poll* or *head*, to that above the groove; *face*, to the wider or flat portion of the surface; *side*, to the narrower part; *front*, to that side farther from the hand, and *back*, to the side nearer the hand when in use.

In celts, the terms are the same, so far as they are applicable; *blade* referring to the lower half of the implement; that is, to the portion on which the cutting edge is formed.

Ground and Pecked Articles.

Grooved Axes.

The implements known as grooved axes seem to be of general distribution throughout the United States; being, so far can be learned from various writers, much more numerous east of Mississippi river than west of it. It must be remembered, however, that thousands of diligent collectors have carefully searched for such things in the east, while in the west little attention has been paid to them; consequently, deductions are not to be made concerning their relative abundance or scarcity, until further knowledge is gained. The same remark will apply to every form of aboriginal relic.

In the eastern and interior states, the grooved axes are far more abundant than the celts of the same size[1], because as a rule only the larger implements of this class are grooved. All the ordinary varieties of axes and hatchets are found about Lake Champlain, by far the most abundant being celts, or grooveless axes.[2]

According to Adair and other early observers, the southern Indians had axes of stone, around the grooved heads of which they twisted hickory withes to serve as handles; with these they deadened timber by girdling or cutting through the bark.[3] According to travelers of a later generation among the western Indians, similar implements were used on the plains to chop up the vertebræ of buffaloes, which were boiled to obtain the marrow.[4]

These statements, which might be multiplied, show that such objects are to be found widely scattered; none, however, give information more definite than that the axes are "grooved," no reference being made to the shape of the ax or the manner of grooving.

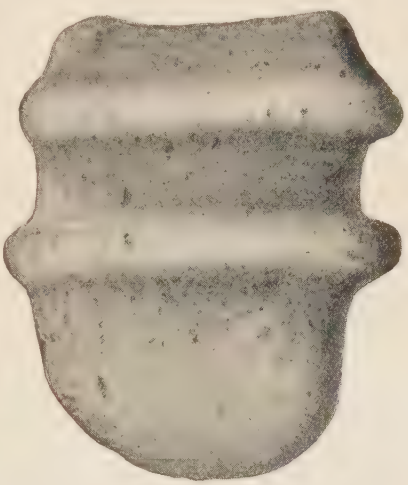


FIG. 29.—Grooved ax, showing groove projections.

The various modes of mounting axes and celts in handles are illustrated in the Smithsonian Report for 1879.

Stone axes were used in Europe by the Germans at as late a period as the Thirty Years' war, and are supposed to have been used by the Anglo-Saxons at the battle of Hastings.[5]

Axes having two grooves occur in considerable numbers in the pueblos of southwestern United States, but they are extremely rare elsewhere and unknown in most districts; as the objects are generally small, the utility of the second groove is not evident.

The arrangement of stone axes may be based upon the manner of forming the groove. In one class are placed those which in the process of making had a ridge left encircling the weapon, in which the groove was formed. This gives the ax greater strength with the same material. Usually the groove has been worked just deep enough to reach the body of the ax; that is, to such a depth that should the projections be ground off there would remain a celt-like implement (as shown in

[1] Abbott, C. C., in American Naturalist, vol. x, p. 494.
[2] Perkins; Ibid, vol. xiii, p. 738.
[3] Adair; History of American Indians, p 405.
[4] Long, S. H.; Expedition to the Rocky Mountains, p. 211.
[5] Knight, E. H.; Smithsonian Report for 1879, p. 242.

figure 29, of chlorite-schist, from Sullivan county, Tennessee). The axes of this class in the Bureau collection are shown in the following table:

District.	Greenstone.	Argillite.	Slemite.	Granite.	Schist.	Quartzite.
Eastern Tennessee	9	8	4	5		1
Western North Carolina	1	1				
Central North Carolina			1	1		
Savannah, Georgia		4		1		
Butler county, Ohio				1	1	

In the second class the groove is formed by pecking into the body of the ax after the latter is dressed into shape; in this pattern a regular continuous line from edge to poll would touch only the margins of the groove, leaving it beneath. An apparent medium between the two is sometimes seen, in which there is a projection on the lower side of the groove only; this is due, usually, to dressing the blade down thinner after the implement was originally worked to a symmetric outline. By continuous or long use the edge of the ax becomes broken or blunted and requires sharpening, and in order to keep the proper outline to make the tool efficient, it is necessary to work the blade thinner as it becomes shorter. No such change is required in the poll, consequently a projection is formed where originally there was no trace of one.

FIG. 30.—Grooved ax, showing pointed edge.

There are different methods of finishing the ax, which may appear with either form of groove. The poll may be worked into the shape of a flattened hemisphere, may be flat on top, with the part between the groove and the top straight, convex or concave, or may be worked to a blunt point, with straight or concave lines to the groove. The blade may taper from the groove to the edge, with straight or curved sides, which may run almost parallel or may be drawn to a blunt-pointed edge. This latter form is probably due to breaking or wearing of the blade, which is reworked, as shown in figure 30, of granite, from Boone county, Missouri.

There are a very few specimens, as noted below, in which the ax gradually increases in width from the poll to the edge; but such specimens seem to be made of stones which had this form approximately at the beginning, and were worked into such shape as would give a suitable implement with the least labor.

In nearly every instance the groove of an ax with a groove projection extends entirely around with practically the same depth, and the blade

of the ax has an elliptical section. There are, however, a few with the back flattened; and while many of the second division may be similar in section, and in having the groove extend entirely around, yet in this class are to be placed nearly all of those only partly encircled by a groove or showing some other section than the ellipse.

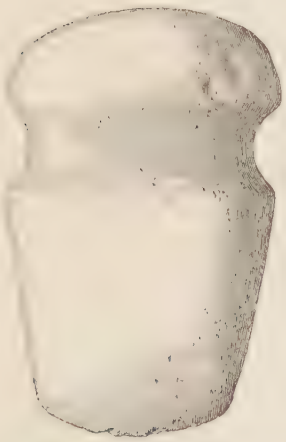


FIG 31.—Grooved ax, showing groove entirely around.

FIG. 32.—Grooved ax, slender, showing groove entirely around.

With these exceptions, the second class of grooved stone axes comprises seven groups, which may be described and tabulated as follows:

A. Grooved entirely around, elliptical section, polls dressed in any of the ways given above; three or four have the blunt-pointed edge (figure 31, of granite, from Bradley county, Tennessee).

District.	Greenstone.	Granite.	Diorite.	Sandstone.	Quartzite.	Argillite.	Slate.	Steatite.	Porphyry.
Southwestern Illinois			1				1	1	
Eastern Tennessee	4	3		2	2	15	4	1	
Central North Carolina		1				1			
Western North Carolina		2				2			
Central Arkansas	1			1					
Ross county, Ohio		1							
Green river, Kentucky			1		1				
Northeastern Kentucky						1			1
Kanawha valley, West Virginia		4	1	1				1	
Keokuk district, Iowa	1	1							
Savannah, Georgia	1			2		6			3
Miami valley, Ohio	2	5	1						

B. Long, narrow, and thin, giving a much flattened elliptical section. These are classed with axes on account of the grooves, although too thin and usually of material too soft to endure violent usage. The edges are nicked, striated, or polished, as though from use as hoes or adzes (figure 32, of argillite, from Bradley county, Tennessee).

District.	Granite.	Argillite.	Slate.
Eastern Tennessee		18	1
Keokuk district, Iowa		1	
Kanawha valley, West Virginia		1	
Montgomery county, North Carolina		1	
Western North Carolina	1		
Butler county, Ohio			2

C. Grooved on both faces and one side; back hollowed, usually in a straight line the whole length; front drawn in from the groove to give

FIG. 33.—Grooved ax, showing grooved back.

FIG. 34.—Grooved ax, showing grooved back.

a narrower edge (figures 33, of porphyry, from Brown county, Ohio, and 34, of granite, from Kanawha valley, West Virginia).

District.	Granite.	Argillite.	Sienite.	Porphyry.
Eastern Tennessee	1	1		
Kanawha valley, West Virginia	1		1	
Butler county, Ohio			1	
Brown county, Ohio				1

D. Same method of grooving; back is rounded, and may be in a straight or curved line the entire length, or a broken line straight in each direction from the groove. The type is illustrated by figure 35, of granite, from Keokuk, Iowa. This specimen is unusually wide and thin; generally the outlines are similar to those last described.

District.	Granite.	Argillite.	Sienite.
Eastern Tennessee		3	
Butler county, Ohio	2		
Keokuk district, Iowa	1		1

FIG. 35.—Grooved ax, showing rounded back.

E. Grooved like the last; same general form, except that the back is flat (figures 36, of sienite, from Brown county, Ohio, and 37, of granite, from Drew county, Arkansas).

District.	Sandstone.	Argillite.	Granite.	Sienite.	Greenstone.
Miami valley, Ohio		2	3		5
Brown county, Ohio				1	
Keokuk district, Iowa		1		1	
Brown county, Illinois			1	2	
Eastern Tennessee		2			3
Kanawha valley, West Virginia			4	1	2
Savannah, Georgia	1				1
Northeastern Kentucky			1		
Licking county, Ohio			1		

F. Grooved on both faces and one side, with both sides flat. There is only one of this form in the collection; it is of argillite, from Keokuk, Iowa.

G. Grooved on faces only, with both sides flat (figure 38, of granite, from Keokuk, Iowa). There are from the same place one of porphyry, one of argillite, and three of sienite. This and the preceding form seem peculiar to that locality.

There are a few exceptional forms which are not placed with those just given, since they may have some features common to all except

FIG. 36.—Grooved ax, showing flattened curved back.

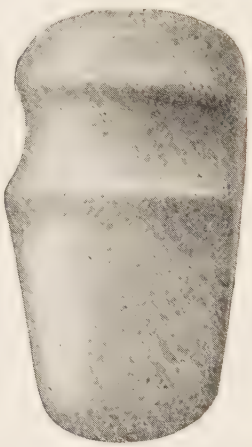


FIG. 37.—Grooved ax, showing flattened straight back.

the Keokuk type, while in other respects they differ from all. Among them are some entire-grooved or grooved only on the two sides and one face; the general outline may correspond with some of the regular forms, but one face is curved from poll to edge, while the other is straight or nearly so (figure 39, of granite, from Wilkes county, North Carolina). This specimen has a depression, as if worn by the end of a handle, on the straight face at the lower edge of the groove.

None of this form are long enough for hoes, and although they may have been used for axes and hatchets their shape seems to indicate use as adzes. Besides the one figured there are two from Savannah, Georgia; three from eastern Tennessee, one with a slight groove and very deep side notches; and three from western North Carolina, two of them entire-grooved with groove projections.

Another unusual form, which may come under any of the foregoing figures, has the groove crossing the implement diagonally, in such a way as to cause the blade to incline backward (figure 40, of granite, from Carter county, Tennessee). Besides the specimen illustrated, this form is also represented by one of granite from northwestern North Carolina with projection for groove; two of argillite from southwestern Tennessee; one, widest at edge, from Savannah, Georgia; one from

FIG. 38.—Grooved ax, Keokuk type.

FIG. 39.—Grooved ax, showing adze form.

Ross county, Ohio; and two of granite, highly polished, grooved on faces and one side, with backs flat, from Kanawha valley, West Virginia.

Of the axes wider at the edge than at any point above (of which the specimen illustrated in figure 41, of granite, from a grave at Kingsport, Tennessee, may be taken as a type,) there are one of diorite from Kanawha valley, West Virginia, which seems to have been of ordinary pattern but broken and redressed to its present form; and from Savannah, Georgia, one of uniform taper with diagonal groove, and one widening irregularly until the blade is fully twice the width of the poll.

FIG. 40.—Grooved ax, showing diagonal groove.

Many, if not a majority, of the entire-grooved axes have the groove wide enough for a very large handle, or for an ordinary withe to be twisted twice around. In those which have one side ungrooved, the intention was to admit a wedge between the stone and the curve of the handle. The handles were very firmly fastened; two axes in the collection have been broken in such a way that on one side, from the top half way down, the blade is gone, carrying away the groove on that side; yet the polish of the groove extends

FIG. 41.—Grooved ax, showing wide edge.

over the fractured surface, which has never been reworked, showing that the tool was long used after this accident. As the handles could easily slip off over the top in specimens thus broken, they must have been tightly lashed; perhaps gum or glue was used.

Partly finished specimens show that the groove was pecked out and the edge ground before the remaining parts of the ax were worked. Some have the edge ground sharp and the groove worn smooth or even polished by long use, while all the rest of the implement retains the original weathered surface. A stone was always chosen that could be brought to the desired form with the least labor, and very often one could be found that required but little work to make a very satisfactory weapon or implement or even ornament.

FIG. 42.—Grooved ax, showing curved edge.

Occasionally specimens indicate by the manner of wear their application to certain kinds of work. Sometimes the edge is curved by the wearing away of one face until it has almost a gouge form; sometimes the side of the blade next the hand, again that farthest away, is more worn. This in time would give the blunt-pointed edge. A peculiar finish of the lower part of the blade, which is also seen in a few celts, is shown in figure 42, of sienite, from Carter county, Tennessee. One half of each face has been left full, and the part opposite hollowed out, giving an ogee curve to the edge. Figure 43, of granite, from Jefferson county, Tennessee, seems to have a ridge on the upper side of the groove; but closer examination shows that it once had a groove projection, and that afterwards the poll was nearly all broken away and a new groove made lower down, so that what was originally the lower projection is now above the groove, the remainder of the poll being worked down to a point.

There are a few hammers which differ from the ordinary ax only in being blunt instead of sharp. They may be nothing more than broken axes, utilized as hammers instead of being resharpened.

FIG. 43.—Grooved ax, showing single groove projection.

Under this head may be placed implements plainly used as adzes. They are much longer than axes in proportion to their other dimensions, have one face convex, the other straight or concave. They may be placed in the same class as the specimen shown in figure 39, and also those represented in figures 44 and 45, from McMinn county, Tennessee. There is also a similar adze from Saline county, Arkansas. All the specimens of this class are of argillite.

With the grooved axes is also placed a class of implements that may be called axes notched on the sides. Many of them were no doubt used as sinkers; but some of the same form, size, and material have the notches and sometimes portions of the face worn perfectly smooth, while frequently they are ground to a sharp edge. Again, even in those that have not the least polish, the edge shows marks that would seem to result from use as axes, adzes, or hoes.

There are three divisions of this class of implements, as follows:

A. Unworked, except notches; probably sinkers.

District.	Sandstone.	Argillite.	Quartzite.	Limestone.
Eastern Tennessee	1	5		
Montgomery county, North Carolina			1	
Northeastern Alabama				5
Kanawha valley, West Virginia	3			

B. Partly ground sharp edges, mostly with polished notches, sometimes with faces polished from one notch to the other (figure 46, of argillite, from Cocke county, Tennessee). In addition there are 11 examples of argillite, besides one of mica-schist from eastern Tennessee and another of sandstone from Savannah, Georgia.

FIG. 44.—Grooved adze.

FIG. 45.—Grooved adze, showing curved blade.

C. Roughly chipped, with notches often at the middle but sometimes nearer one end. Probably most of these were sinkers; but as above stated the edges show marks of use, apparently in scraping, digging, or striking. Of these the following examples are in the Bureau collection: From several localities in eastern Tennessee, 40 of argillite; from Montgomery county, North Carolina, 24 of argillite and quartzite;

from Kanawha valley, West Virginia, and from Savannah, Georgia, a few specimens of the same materials.

Celts.

What is true of the uses and distribution of stone axes applies with much the same force to what are called celts—not a good descriptive term, but one which is now given to the implement in lieu of something better. It would appear difficult or impossible to do with these rude tools any work for which we commonly use an ax or hatchet; and yet, by the aid of fire, or even without it, the aborigines contrived to accomplish a great deal with them.

The Maori of New Zealand do all their wonderful work of wood carving with only a chisel or adze (of stone or shell).[1] Among the Iroquois, in cutting trees, fire was applied at the root, the coals were scraped away with a chisel, and this process was repeated until the tree was felled. The trunk was divided into lengths in the same way. Similarly canoes and mortars were hollowed out.[2] The Virginia Indians at an early day employed a similar process. They also cleared ground for cultivation by deadening trees with their tomahawks,[3] and used adzes made of shell in cleaning out the charred wood in making canoes.[4] The Nootka of the northwestern part of the continent in felling a tree use a flint or elkhorn set in a handle, this being struck with a stone mallet. In hollowing canoes a musselshell also is used as an adze, and sometimes fire is applied. The outside is shaped by similar means.[5]

Fig. 46.—Notched ax, showing polished edge.

Stone chisels have been found in various steatite quarries, where vessels and other utensils of this material were made, and the marks of their use is plain both on the vessels in an unfinished state and on the cores, as well as on the quarry face.[6]

The different ways of hafting, as shown by specimens in the Bureau collection, were as follows:

(1) A hole was cut entirely through a stick and the celt was inserted so that it would project on both sides;

(2) The hole was cut partly through, and the celt was pushed in as far as it would go;

[1] Wood, J. G.; Natural History of Mankind, p. 200.

[2] Morgan, L. H.; League of the Iroquois, p. 358.

[3] Beverly, Robt.; History of Virginia, 1722, p. 198.

[4] Wyth, John; Graphic Sketches, part I, plate 14.

[5] Catlin, Geo.; Last Rambles Among the Indians, pp. 100–101.

[6] Mohr, Smithsonian Report for 1881, p. 618; Barber, Amer. Nat., vol. XII, p. 403; McGuire, Ibid., vol. XVII, p. 587; Walker, Science, vol. IX, p. 10; Schumacher, Eleventh Annual Report of Peabody Museum, p. 263.

(3) The top of the celt was set in a socket of deer horn, which was put into a handle as in form 2;

(4) Small celt-shaped knives or scrapers were set into the end of a piece of antler long enough to be used as a handle;

(5) A forked branch was so cut as to make two prongs of nearly equal length, and the celt was fastened to the end of one, parallel with it, the other being used to guide and steady it, a prong being held in each hand;

(6) The fork of a root or branch was trimmed so as to make a flat face at any desired angle, to which the celt was lashed, a shoulder, against which the end of the celt was set, being sometimes cut in the wood;

(7) A stick was split its entire length and a single turn taken around the celt, the ends being brought together and tied, forming a round handle;

(8) A stick was split part way, one fork cut off and the other wrapped once or twice and tied, thus forming a round handle of solid wood.

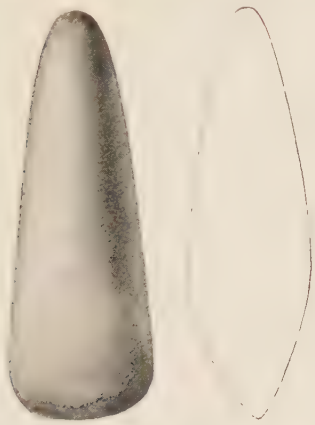


FIG. 47.—Celt, showing blade thick near edge.

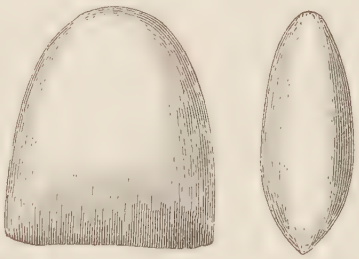


FIG. 48. Celt, showing blade thick near edge.

Forms 5 and 6 were used as adzes; forms 7 and 8 are the same methods as employed in hafting grooved axes.

A mounting similar to form 4 is seen in some Alaska specimens of celt-scrapers in which the implement is fastened to a piece of wood so as to project a short distance, and used like a plane. In all these, the celt is very firmly fastened to the handle with sinew or rawhide, which, when put on green, contracts with great force and binds like wire.

As to the forms of celts, no division is practicable based on anything but their entire appearance. The following descriptions and tabulations represent the material of this kind in the Bureau collection:

A. Round or nearly round section, pointed or flattened at the top, blade rapidly thickening from the edge; a few are polished at the top, but most of them show marks of a maul or hammer; all have been highly polished; all of this class were probably used as wedges, as their shape renders them more fit for this purpose than for any other; the

battered tops indicate such usage. The few not showing such marks may have been set into a bumper of wood or horn, or used with wooden mauls. They vary in length from $2\frac{1}{2}$ to $7\frac{1}{2}$ inches. They are represented by the specimen shown in figure 47, of argillite, from Lincoln county, Arkansas; there are also one from a mound in Sumter county, Alabama (figure 48), and one from Kanawha valley, West Virginia, both of serpentine and elliptical in section, though the form of the edge puts them in this class. The following specimens are typical representations of the class:

District.	Sienite.	Argillite.	Granite.	Rotten limestone.	Sandstone.
Northwestern North Carolina	3	7	2		
Eastern Tennessee		3			
Western Tennessee				1	
Southeastern Arkansas		2			
Union county, Mississippi	1				
Madison county, Illinois			1		
Savannah, Georgia	2				1

B. Long, narrow, elliptical section, pointed top, curved or straight edges, sides straight or gently curved. None of these seem to have

FIG. 49.—Celt, showing long, slender form.

been put to any rough use, as the edges are quite sharp and the entire surface is well polished; length from $4\frac{1}{4}$ to $12\frac{1}{2}$ inches. The type is illustrated by figure 49, of argillite, from a mound in Monroe county, Tennessee.

District.	Argillite.	Granite.	Sandstone.	Quartzite.	Sienite.
Eastern Tennessee	8	3			
Northwestern Georgia		1			
Savannah, Georgia			6	1	3
Kanawha valley, West Virginia					1
Northeastern Alabama					1
Western North Carolina	1				

C. Thick, almost round section, round-pointed top, nearly straight to sharp-curved edge, sides gently curved, widest at edge or just above. Most of these show marks of use as cutting tools or hatchets. In

many the top has been roughened as if for insertion into a hole cut in a piece of wood; others have this roughening around the middle or immediately above, leaving a polish at both ends, and these were hafted probably by means of a stick or withe twisted around them. The roughening is a secondary operation, having no relation to the making of the implement; it was produced by pecking after the surface was polished. In a few cases it extends from the top well down the sides; but usually it reaches but a little way below the top, or else is in a circle around the body of the celt. Most of them have sharp edges; a few have edges either chipped or blunted and polished, showing long usage. Two from Kanawha valley (one roughened for handle) have the edges worn in on one of the faces until they almost resemble gouges; but that they were not intended as such is shown by the concavity being nearer one side and not reaching entirely across. The length ranges from 4½ to 10 inches. The type is illustrated by figures 50 and 51, both of sienite, from Lauderdale county, Tennessee.

FIG. 50.—Celt, nearly round section.

FIG. 51.—Celt, nearly round section.

This may be regarded as the typical form of celt for eastern United States, and its geographic distribution is exceptionally wide, as shown in the table.

The Bureau collection includes the following specimens of this class:

District.	Porphyry.	Sienite.	Granite.	Argillite.	Greenstone.	Sandstone.	Diorite.	Compact quartzite.
Western North Carolina	4	2	9	16	...	...	...	..
Montgomery county, North Carolina	1	...	...	...	...	...	...	...
Coosa district, Alabama	...	1	...	...	...	...	...	..
Ross county, Ohio	...	...	1	...	...	...	...	...
Knox county, Ohio	...	...	...	...	...	1	...	...
Miami valley, Ohio	...	1	2	...	...	...	...	...
Eastern Tennessee	...	5	...	1	...	...	...	...
Green river, Kentucky	...	...	1	...	...	...	...	..
Northeastern Kentucky	...	...	...	...	1	...	2	.
Northeastern Arkansas	...	...	...	...	...	...	...	...
Kanawha valley, West Virginia	...	4	4	...	...	...	3	1
Crawford county, Wisconsin	...	...	1	...	...	...	...	...
Southwestern Illinois	...	...	2	...	...	...	...	1
Savannah Georgia	..	3	2	...	...	2	...	...
Western Tennessee	...	2	..	..	...	...	..	..

D. Of the form last described, except in being much thinner; some have the tops battered, showing use as wedges; length from 3 to 9 inches.

District.	Argillite.	Porphyry.	Sienite.	Diorite.	Sandstone.	Granite.	Hornblende.	Greenstone.	Serpentine.	Compact quartzite.
Eastern Tennessee	11	3	2			1	1		1	
Kanawha valley, West Virginia			2	5	2	6				
Northwestern Georgia			3					1		
Savannah, Georgia					2					
Green river, Kentucky						1				
Northeastern Kentucky						2				
Southeastern Arkansas								1		
Central Arkansas										1
Northeastern Arkansas					1					1
Butler county, Ohio				2						
Northwestern North Carolina	8	2	1			4				

E. Pointed oval, or nearly diamond section, sides straight or slightly curved; length 6 to 12½ inches. Few as these are, they vary considerably in appearance. The group is illustrated by figure 52, showing a specimen of brown flint, containing numerous small deposits of chalcedony, from Benton county, Tennessee; polished over the entire surface, the edge highly so.

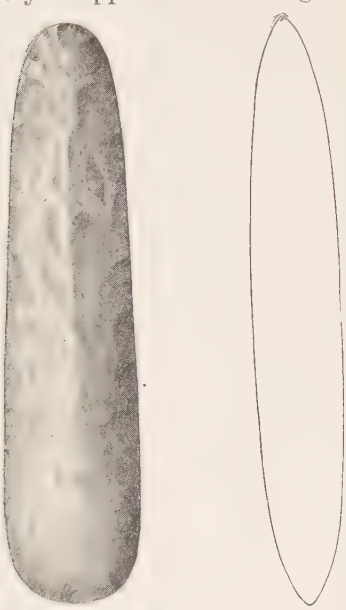


FIG. 52.—Celt, showing nearly diamond section.

In addition, there are the following examples: From Caldwell county, North Carolina, one of porphyry and one of granite, the latter roughened on sides for handle; from McMinn county, Tennessee, one of gray flint, highly polished over its surface, except the top, which is much battered; from Cocke county, Tennessee, one of argillite.

F. Elliptical section, flattened or rounded top, edge curved or nearly straight, sides straight or gently curved, tapering from edge to top or in a few cases nearly parallel. These present many variations in finish and in evidence of use. Some are well polished over the entire surface; some have only the lower part polished; while some are entirely without polish except at the extreme edge. In some the top is battered; some have the surface roughened for handle at the top, others around the middle, still others all over the upper half or even more than half. One from McMinn county, Tennessee, has a roughly pecked shallow groove at the middle. Several have the edge

very blunt, the faces at the edge form almost a right angle; these are thickest very near the edge and become gradually thinner toward the top. Most of this kind are from Caldwell county, North Carolin the

FIG. 53.—Celt.

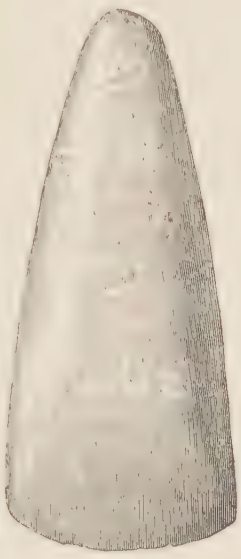


FIG. 54.—Celt.

FIG. 55.—Celt.

same form coming also from Monroe county, Tennessee, and from Savannah, Georgia. The length is from 3 to 7½ inches. Figure 53, of compact quartzite, from Monroe county, Tennessee; figure 54, of granite; and figure 55, of sienite, from Caldwell county, North Carolina.

District.	Hornblende.	Serpentine.	Compact quartzite.	Argillite.	Sienite.	Porphyry.	Granite.	Micaceous sandstone.	Diorite.	Greenstone.	Sandstone.	Flint.
Eastern Tennessee		4	4	20	7		4	1	1			
Western North Carolina	1		4	22	4	3	5					
Montgomery county, N. C.								1				
Coosa district, Alabama								2				
Southwestern Illinois			1				7					
Kanawha valley, W. Va.				3	7		5		10		1	1
Keokuk, Iowa							1					
Southwestern Wisconsin						1	1					
Miami valley, Ohio						2	3					
Northeastern Arkansas	1			1			2			2		
Southeastern Arkansas											1	
Northwestern Georgia				1	2							
Savannah, Georgia		2			2		1				7	
Yazoo county, Mississippi					5		2					

G. Of the same general pattern as the last, except that the sides widen just before reaching the edge, giving a "bell shape" (figure 56). The length is from $6\frac{1}{4}$ to 8 inches. In this group there are two specimens of granite, two of porphyry, and one of sienite, all from Yazoo county, Mississippi. Two have their tops roughened.

FIG. 57.—Celt, showing rectangular section.

H. Rectangular section, occasionally with the corners sufficiently rounded to give a somewhat elliptical section; top flattened or rounded; sides straight and parallel or nearly so, sometimes very slightly curved. Most have polished surfaces; only three or four show any battering, or roughening for handle. A large one of hornblende from Lauderdale county, Tennessee, has the edge dulled and polished by use. Length is from 2 to 9 inches. Figure 57, of argillite, from a mound in Monroe county, Tennessee. The distribution of this class of celts is wide, as shown by the following table:

FIG. 56.—Celt, showing "bell shape" and roughening for handle.

District.	Sandstone.	Argillite.	Porphyry.	Granite.	Sienite.	Diorite.	Hornblende.	Limestone.	Jasper.	Serpentine.
Eastern Tennessee	1	10	2	1					1	
Western Tennessee							1			
Northeastern Kentucky			1	1	1		1	1		
Green river, Kentucky					1					
Southwestern Illinois				2	1					
Miami valley, Ohio				2	2	1	1			
Kanawha valley, West Virginia	1			8	4	4	1			
Northwestern Georgia										1
Savannah, Georgia									1	
Central Arkansas									1	
Northwestern North Carolina										1

I. Thickest at top (wedge form), section elliptical or nearly rectangular; sides straight or curved, widest at edge or nearly parallel. A few are roughened for handling, and one or two are battered at top by hammering; most are small. The type is shown in figure 58, of granite,

from Carroll county, Indiana. This class of celts also is widely distributed and diverse in material.

District.	Hornblende.	Granite.	Syenite.	Comp. quartzite.	Argillite.	Greenstone.	Sandstone.	Diorite.	Porphyry.	Basalt.
Eastern Tennessee		3	4		1					
Northeastern Arkansas	1					1				
Southeastern Arkansas		1		1						
Butler county, Ohio				1						
Green river, Kentucky			1							
Northeastern Kentucky		3						1	1	
Crawford county, Wis										1
Southwestern Illinois		3	1							
Savannah, Georgia							2			
Kanawha valley, West Virginia	1	7	5			1		5	2	

J. Flat on one side, convex on the other, giving a semi-elliptical section; sides nearly parallel; top flat or rounded. These were evidently

FIG. 58.—Celt, showing wedge-shape.

FIG. 59.—Celt, showing half-elliptical section.

intended for scrapers; none are at all chipped or battered from use, and with very few exceptions the whole surface is highly polished. The flint and jasper specimens, which have been first chipped into shape, have the facets and edge as smooth as though finished on an emery

wheel. Similar forms, except with flat instead of convex upper surfaces, are known to have been used as adzes, but these have no marks of such use. The length ranges from 2 to 8 inches, but most are small. The type is shown in figure 59, of brown flint, from a grave in Alexander county, Illinois.

District.	Granite.	Argillite.	Porphyry.	Compt. quartzite.	Yellow jasper.	Gray jasper.	Novaculite.	Sienite.
Eastern Tennessee		4	1	1				
Central Arkansas				1				
Northeastern Arkansas					4	1		
Southeastern Arkansas							1	
Southwestern Illinois	1							
Butler county, Ohio				1				
Northeastern Kentucky	2							
Tuscaloosa district, Alabama				1				
Northwestern North Carolina	1	2						1

K. Similar to last, except that the sides come to a point at the top; length, 3½ to 9 inches. Very few of either pattern are above 5 inches long, the larger ones being mostly of flint (figure 60, of sienite, from Warren county, Ohio).

District.	Yellow jasper.	Sienite.	Diorite.	Gray jasper.	Argillite.	Compt. quartzite.
Northeastern Arkansas	2					
Western Tennessee		1				
Eastern Tennessee	1			2	5	
Kanawha valley, West Virginia			1			
Southwestern Illinois				2		1
Warren county, Ohio		2				

L. Sides concave, top narrow. Nearly every specimen has the upper portion pecked rough; one from Bradley county, Tennessee, and another from Mississippi county, Arkansas, are entirely polished. The latter has the scraper-form edge to be described later and is of exceptionally large size; it measures 5½ inches, being the only one exceeding 5 inches in length.

M. Top flat, round, or pointed; the blade usually begins a little below the middle, and is perfectly smooth in every case; in some the blade is not over an inch in length, probably reduced by continual sharpening. They may have been scrapers, though they do not have that form; if

used as weapons they were probably set into the end of a piece of antler, which, in turn, was set in a club. The type is shown in figure 61, of argillite, from Monroe county, Tennessee.

District.	Argillite.	Sienite.	Granite.	Quartzite.	Hornblende.
Eastern Tennessee	7	1	2		
Kanawha valley, West Virginia		1	1		
Northeastern Arkansas		1		1	
Southeastern Arkansas					1
Southwestern Illinois	1		2		

N. Ground down thin, with a flat-elliptical or nearly rectangular section; sides straight or slightly curved, nearly parallel or tapering considerably to the top, which is either rounded or flattened. All are polished over the entire surface; none show any marks of use as wedges

FIG. 60.—Celt, showing half-elliptical section.

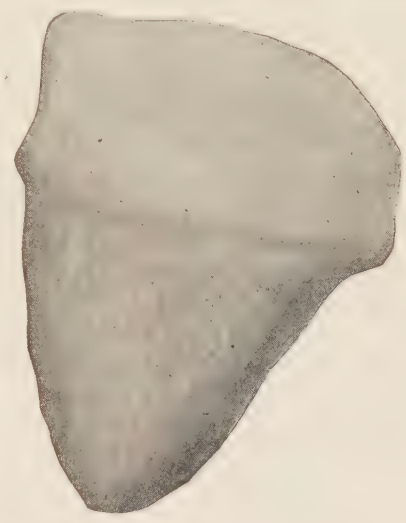


FIG. 61.—Celt, showing concave sides

or hatchets, and most of them are too delicate for such use. The longer ones can be readily grasped in the hand, and are as well adapted to stripping off the hide of an animal, dividing the skeleton at the joints, or stripping the flesh from the bones, as anything made of stone can be; while the smaller ones, set in a handle to afford a grip, would answer the same purpose. There are three which are sharp at both ends, one having one symmetrical and one scraper-form edge; one having a scraper-form edge at each end on opposite sides; and one of rather soft argillite, unfinished, which has marks of pecking, chipping, and grinding, showing that any of these methods were practiced, as was most convenient. All these are from eastern Tennessee. The features are illustrated in

figures 62, of argillite, from a mound, Caldwell county, North Carolina; 63, of black flinty slate, very hard, from a mound, Poinsett county, Arkansas; and 64, of argillite, from a mound, Monroe county, Tennessee.

District.	Marble.	Argillite.	Sienite.	Quartzite.	Serpentine.	Diorite.	Porphyry.	Granite.	Sandstone.	Hornblende.	Compact quartzite.	Slate.	Chert.
Northwestern North Carolina		2	2	1									
Montgomery county, North Carolina		1											
Eastern Tennessee	1	53			5		1		4		7	2	
Western Tennessee		1											
Northwestern Georgia					1						1		
Savannah, Georgia		2	1		1						1		
Union county, Mississippi									1				
Butler county, Ohio												1	
Northeastern Arkansas			1						1			1	1
Southeastern Arkansas				1									
Kanawha valley, West Virginia			2			6	2	2	1	1			
Northeastern Kentucky			1				1	1					
Green river, Kentucky			1										
Coosa district, Alabama		1		1	1								

FIG. 62.—Thin polished celt.

FIG. 63.—Thin polished celt.

FIG. 64.—Thin polished celt.

GOUGES.

While there are perhaps no true gouges in the collection, there are some examples of a form between a celt and a gouge, illustrated in figure 65, of serpentine, from Caldwell county, North Carolina.

Implements of this form are known to have been used to tap sugar maples, and also to hollow out wooden troughs, and are very common

in the north, though less abundant in the south.[1] It is in those localities in which bark instead of logs was used for canoes that they are most numerous. Sometimes they were hollowed the whole length and used as spiles.[2] They were also employed instead of celts in hollowing wooden mortars and the like when a more regular concavity was desired.[3]

Chisels and Scrapers.

The aboriginal implements known as "chisels" are round, elliptical, or rectangular in section. The flint and jasper specimens are generally widest at the edge, the reverse being usually the case with those of other material. Most of them have marks of hammers at the blunt end, though some are polished at the top and a few, from eastern Tennessee, are sharp at both ends. The top (except in the double-edged ones) is usually flat, though a few are pointed or very thin, almost with cutting edges. Jaspers and flints are chipped, with the facets polished, the edges highly so. Any form may occur in any locality. Almost invariably they have scraper-form edges. The length is from 2 to 6 inches.

Fig. 65.—Celt, showing thin, gouge-form edge.

Typical examples are shown in figure 66, of yellow jasper, from a grave in Mississippi county, Arkansas; figure 67, of novaculite, from an unknown locality in Arkansas; figure 68, of serpentine, from Bradley county, Tennessee; figure 69, of sienite, from Caldwell county, North Carolina; and figure 70, of gray jasper, from Bradley county, Tennessee. Some specimens are sharp and worn at both ends, and could have been used only with handles.

Fig. 66.—Celt, chisel-form.

Fig. 67.—Celt, chisel-form.

Fig. 68.—Celt, chisel-form.

[1] Dawson, J. W.; Fossil Men, p. 16.
[2] Ibid., p. 132.
[3] Morgan, L. H.; League of the Iroquois, p. 358.

The Bureau collection includes the following specimens:

District.	White flint.	Serpentine.	Siemite.	Argillite.	Granite.	Yellow jasper.	Gray jasper.	Mottled jasper.	Red jasper.	Silicified wood.	Quartzite.	Black flint.	Novaculite.	Compact quartzite.	Porphyry.	Sandstone.	Hornblende.
Northwestern North Carolina			1	2	1												
Northeastern Arkansas						32	5	2	4	1	1	1					
Southeastern Arkansas			1			2							3				
Coosa district, Alabama		1									1						
Warren county, Ohio					1												
Southwestern Illinois	2		1														
Eastern Tennessee				40			1							2	1	3	1
Union county, Mississippi																1	
Kanawha valley, West Virginia												5					
Northwestern Georgia				1													
Savannah, Georgia				1													

The high polish sometimes found on the top of a round-pointed celt may be due to its working slightly in the socket in its handle of wood, deerhorn, or other material.

By celts having a scraper-form edge is meant those having the edge to one side of the median line, due to constant use of one face. This face, at the edge, is in a straight line from side to side; it may have a chisel-like flattening, or may curve toward the middle of the celt for a short distance and then have the same form to the top as the other face, which is convex or curved, as in the ordinary hatchet-celt. They form a medium between celts whose faces gradually curve from top to edge, and the celt-scrapers which are flat on one side. Among the thicker celts this form is quite rare, though several, especially one from Kanawha valley, West Virginia (represented in figure 74), are quite pronounced. In the thinner specimens, however, a majority are of this pattern, while in some types, nearly all indeed, even those up to 6 inches long, are so beveled. The type, of which an illustration is shown in figure 71, is of very hard black slate; the same form is presented in figures 66 and 70.

FIG. 69.—Celt, chisel-form.

FIG. 70.—Celt, chisel-form.

From Bartow county, Georgia, is a scraper made from the edge of a celt which has been broken diagonally across from one face to the other. A stem like that of a spear-head has been formed by chipping away the sides of the part broken, which gives a convenient attachment for a handle; the original edge is unchanged except in the wear which has resulted from its new use.

The specimen shown in figure 72 (of argillite, from McMinn county, Tennessee) is introduced on account of its undoubted use as a scraper, and because it is much smaller than some of the chipped flints thus classified, the edge being less than an inch wide; the sides are roughly incurved.

In Bradley county, Tennessee, there were found over 200 specimens of very small, thin, flat, waterworn sandstone pebbles, which were mostly in their natural condition, except that they had one side rubbed to a sharp edge. A few, more slender, were ground to a point. Some of them have a handle chipped out on the side opposite the edge, sometimes with nicks in it, made for attachment to a handle by means of a cord. Most of these specimens are less than 2 inches in length. No suggestion is offered as to their use.

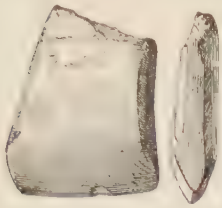


FIG. 71.—Celt, showing scraper-form edge.

FIG. 72.—Scraper.

A granite implement from Union county, Illinois, with nearly rectangular section, slightly curved sides, rounded corners, and high polish over the entire surface, having nearly the same thickness (about an inch) at every part, would seem to be a polishing or rubbing stone. There are, however, one from Warren county, Ohio, and three from Kanawha valley, West Virginia, of almost exactly the same size and pattern, which have had one end ground off to a sharp edge; so the specimen may be only an unfinished celt. One of those from Kanawha valley has had the edge partly broken away, and one face has been pecked considerably in an attempt to restore it for use; but the intention was not carried out. Some celts, not of the scraper pattern, which have the edge to one side of the median line, are perhaps broken or blunted specimens redressed on one side only.

FIG. 73.—Scraper or adze, with projecting ridge.

FIG. 74.—Adze or scraper.

Figure 73 exhibits a specimen of argillite from Carter county, Tennessee, probably an adze or scraper, with a projection to keep the

implement from being forced into the handle. The edge is symmetrical, though much striated. The specimen shown in figure 74 (of granite, from Kanawha valley, West Virginia) represents a peculiar form. There are several like it in the collection, all but this one from islands in the Pacific.

Chipped Celts.

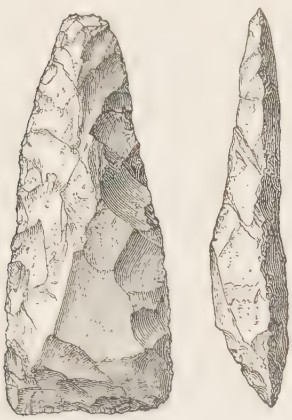


Fig. 75.—Chipped celt.

On account of their shape and undoubted use, a class of celts, although neither pecked nor ground, is introduced. Many of them resemble, in most respects, the so-called paleolithic implements, though sometimes of better finish. They are made with a rounded top and nearly parallel sides; rudely triangular; or with the sides curved to a point at the top. The edge may be straight or curved, and is usually chipped, though sometimes ground; a few are chisel-shaped. Usually they show no signs of wear; when they do, it is always in the form of a polish at the larger end, or on the exposed facets. One of black flint, 8 inches long, from Kanawha valley, has a scraper-form edge, smoothly polished. Many, even of those scarcely changed from their original form and natural surface, have the edges dulled and polished from use as scrapers or adzes.

Fig. 76.—Chipped celt.

The collection includes the following examples: 36 of argillite, flint, porphyry, and compact quartzite, from Montgomery county, North Carolina, some with the wider edge sharp (figure 75, of flint); 12 of limestone and flint from Mason county, Kentucky; 70 of argillite, a few with the edges ground, from southeastern Tennessee (figure 76, from McMinn county); over 300 from Kanawha valley, nearly all of black flint, a few being of diorite or quartzite—some are partly polished, or have ground edges (figure 77, of black flint, from a mound).

Fig. 77.—Chipped celt.

Hematite Celts.

With the exception of two from Iowa and a few from Preston county, West Virginia, the hematite celts in the collection are from Kanawha valley, and are small, ranging in length from 1 to $2\frac{3}{4}$ inches, except one $4\frac{1}{2}$ and one $5\frac{1}{2}$ inches. They are illustrated in figures 78, 79, 80, and 81, the last from a mound. Nearly all have been ground directly from the

nodule or concretion in which this ore of iron so frequently appears. Occasionally one of homogeneous structure has been chipped into form before grinding, the facets in some cases being rubbed nearly away. Sometimes they have a rectangular outline, but usually the sides taper from the edge to the top by a gradual curve, or are parallel a part of the way and then taper either by a straight or, oftener, by a curved line. The section is rectangular or elliptical.

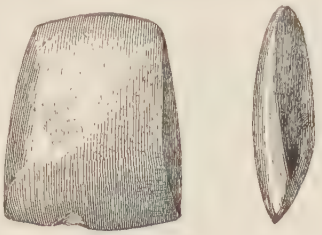


FIG. 78.—Hematite celt.

These implements were probably used as knives or scrapers, being set into the end of a piece of antler, which may in turn have been set into a larger handle of wood. That some were knives is shown by the edge which is dulled to a flat polished surface extending from side to side; and that many were scrapers is shown by their celt-scraper shape, a half elliptical section, or by the scraper-form edge, seen in the largest specimen. Some, however,

FIG. 79.—Hematite celt.

FIG. 80.—Hematite celt.

FIG. 81.—Hematite celt.

have the edge symmetrical, as in the hatchet-celts. One has incurved sides, and is roughened on the sides and on the faces near the top.

PESTLES.

The fact of the ordinary conical or bell-shaped, long-cylindrical, or somewhat pear-shaped stones having been used for pestles is so well settled that no confirmatory references are needed. A few citations may be given in regard to certain forms sometimes differently classed, especially some of the discoidal stones to be hereafter described.

According to Stevens, the corn crushers used by the Swiss lake-dwellers are spherical; some are flattened on two sides, like an orange, others almost round with depressions on four sides. They are about the size of a man's fist or rather smaller. The Africans have a piece of quartz or other hard stone as large as half a brick, one side of which is convex, to fit the hollow of a larger stone used as a mortar.[1] Evans observes that disks sometimes show marks of use as ham-

[1] Stevens, E. T.; Flint Chips, p. 174.

mers or pestles;[1] one found at Ty Mawr was thick, with a cavity on each face.[2] In preparing pemmican, the American Indians are known to have pounded the dried meat to a powder between two stones.[3] This gives the impression that any suitable stones may have been used; and the ancient California Indians worked out a round stone as an acorn sheller, modern tribes using any smooth stone.[4]

FIG. 82.—Handled pestle, with expanding base.

The pestles which have the bottom round or convex are generally found in the same localities as the hollowed stone mortars. Several forms of pestles are represented in the collection. They may be grouped as in the following description and tabulation.

A. With expanding base; bottom flat or slightly convex, often with a slight depression in the middle. Handle tapering, or of uniform diameter to the top; in a few, slightly swelling above as if to give a firmer hold. Top rounded, flat, or pointed. Bottom may be very little expanded or may have twice the diameter of the handle. Probably used for pounding grain or seeds on a flat stone, as it could not be used in a mortar even slightly hollowed. None seem to have been used as mullers or rubbers. They may have served for hammers, and would be excellent for cracking nuts, as the pit in the bottom would tend to keep them from flying out to the side. The type is shown in figure 82, of quartzite, from Sullivan county, Tennessee. The distribution is moderately wide, and the material chiefly granite and quartzite, with a few of other rock varieties, as shown in the table:

District.	Quartzite.	Granite.	Sienite.	Diorite.	Sandstone.	Argillite.
Northeastern Kentucky	2	2			1	
Eastern Tennessee	3	6				1
Ross county, Ohio	2	1				
Miami valley, Ohio	1	7	1	2		
Southwestern Illinois		1				
Kanawha valley, West Virginia	1	1		1	1	

B. Almost cylindrical, from 6 to 18 inches long and about two inches in diameter. Some of the larger ones were probably rolling-pins, as

[1] Evans, John: Stone Implements, p. 218.

[2] Ibid., p. 227.

[3] Dodge, R. I; Wild Indians, p. 254. Schoolcraft, H. R.; Indian Tribes, vol. IV, p. 107. Catlin, Geo.; North American Indians, vol. I, p. 416.

[4] Powers, Stephen; Contributions to N. A. Ethnology, vol. III, p. 433.

the ends, either from some fancy finish, or because worked to a point, are of a shape that would make their use as pestles impracticable. Even as rollers, some must have been used for crushing grain that had previously been softened or was not fully matured, as they are of a soft stone that would wear very easily. The shorter ones are blunt at the ends, and may have been used in a shallow wooden mortar; none are adapted for use in stone. The class is illustrated by figure 83, of soft clay slate, from Cherokee county, Georgia.

FIG. 83.—Pestle, long cylindrical form.

District.	Argillite.	Soft slate.	Clay slate.	Mica-schist.	Quartzite.
Montgomery county, North Carolina	1				
Northwestern North Carolina	1				
Eastern Tennessee	3	2	3	1	
Butler county, Ohio				1	
Northwestern Georgia			1	1	
Hopkins county, Kentucky					1

C. Conical, or truncated cone, bottom flat, convex or curved from one side to the opposite. Some are quite smooth on the bottom as if from rubbing either back and forth or with a rotary motion; while many have the bottom pecked rough, showing use as hammers or pounders. For those with curved bottoms a rocking motion seems best adapted; with the palm resting on the longer side, good work could be done in any of these ways. Typical specimens are shown in figures 84, of quartzite, from Monroe county, Tennessee; 85, of granite, from Warren county, Ohio; and 86, of quartzite, from Saline county, Arkansas. A somewhat aberrant specimen, shown in figure 87, of granite, from Carter county, Tennessee, has an elliptical base, rounded top, and flat bottom; the longer sides grooved for handle. A similar one, of quartzite, came from Warren county, Ohio. There is considerable variety of material, quartzite largely predominating. Although

FIG. 84.—Pestle, conical.

the geographic range is wide, the distribution is rather sparse, and several districts are not represented.

District.	Quartzite.	Marble.	Sienite.	Hornblende.	Granite.	Diorite.	Sandstone
Southeastern Arkansas	2						
Central Arkansas	1						1
Eastern Tennessee	12	1			1		
Miami valley, Ohio	3		1		3	2	
Montgomery county, North Carolina			1	1			
Kanawha valley, West Virginia	2						1

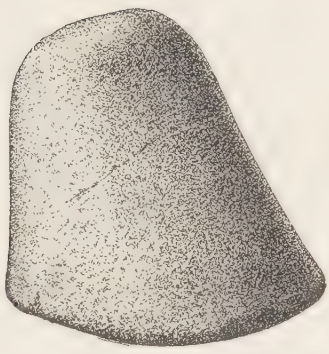


FIG. 85.—Pestle.

FIG. 86.—Pestle.

D. Conical, or truncated cone, with top more or less rounded, very little worked, a stone of approximate form having been chosen and the angles and corners pecked off; bottom flat, and in some quite smooth; used as pestles or mullers.

FIG. 87.—Pestle, grooved for handle.

FIG. 88.—Pestle.

The group is represented by 17 specimens of quartzite, all from southeastern Tennessee.

E. Not dressed at all on the sides, but with both ends worn to a convex shape. Represented by two specimens of quartzite from southeastern Tennessee.

F. Cylindrical, flat bottom, dome-shaped top, these portions having been carefully pecked into shape. Some are smoothly polished on the bottom, but none elsewhere. Those from Miami valley, and one from Kanawha valley are much longer than the others. The type illustrated in figure 88 is of quartzite, from McMinn county, Tennessee.

District.	Quartzite.	Porphyry.	Sandstone.	Limestone.
Eastern Tennessee	5	1	1	.....
Kanawha valley, West Virginia	1	.....	3	.....
Miami valley, Ohio	.....	.....	1	1

PITTED STONES.

There is scarcely a locality in the country where pitted stones are not found; they are indeed of such frequent occurrence that they are seldom considered worth the trouble of gathering.

There can be no "type" among such crude implements; they are almost invariably waterworn sandstone pebbles, with a pit varying from a slight roughening of the surface to a hollow half an inch in depth pecked in each face. They probably belong with hammerstones, as they seldom show other marks of work, the edge in some being only slightly marked in one or two places, while in others it is much worn.

Various numbers of the Journal of the Anthropological Society of Great Britain and Ireland refer to pitted stones as found in every part of the world. According to Evans, slight pits aid in holding stone hammers; they also prevent the jar to a large extent. If used to pound meat or break bones, it would be hard to hold them when greasy without pits.[1] Such implements may have had handles of wood with projections to fit the pits,[2] though this is not probable; but if so a piece of buckskin on the handle opposite the pits would do better and be more convenient to apply.

CUPPED STONES.

Conjecture and theory have had full sway in regard to the uses of cupped stones; but the question is apparently far from solution. There is a prevalent idea that they were used for cracking nuts; but why should an Indian make a large number of holes in a great many stones for such purpose? It is true there would be an advantage in having the nut stand on one end; but very few stones have depressions that will allow this.

Of the southern Indians Adair observes:

They gather a number of hiccory-nuts, which they pound with a round stone, upon a stone, thick and hollowed for the purpose. When they are beat fine enough, they

[1] Stone Implements, p. 218.

[2] Ibid., p. 213.

mix them with cold water, in a clay bason, where the shells subside. The other part is an oily, tough, thick, white substance . . . with which they eat their bread.[1]

Lawson's language regarding the Indians of North Carolina is even more definite. He says:

[They gather] likewise hickerie nuts, which they beat betwixt two great stones, then sift them, so thicken their venison broth therewith, the small shells precipitating to the bottom of the pot, whilst the kernel, in the form of flour, mixes it with the liquor, both these nuts [hickory and chinquapin] made into meal makes a curious soup, either with clear water, or in any meat broth.[2]

Neither of these statements seems to have any reference to cupped stones. The first is a good description of a mortar with a round pestle, while the second says nothing about any particular form of stone; yet they have been referred to time and again as proof of the nut-stone theory. There would be some difficulty in pounding nuts fine in small holes half an inch or more below where the pounding stone could reach.

C. C. Jones[3] was satisfied that cupped stones were used for cracking nuts because great numbers of nut-bearing trees grow where they are found; while Whittlesey, noting the fact that hundreds of them are found throughout northern Ohio, considered them as sockets in which the end of a spindle rested. Dawson[4] speaks of "stones having deep hollows in the sides which were mortars for grinding pigments, or sockets for fire drills."

The cupped stones in the Bureau collection are almost invariably of reddish sandstone, of varying texture, from a few ounces to 30 pounds in weight. The holes are from one to twenty-five in number, of various sizes even in the same stone, and follow the natural contour of the surface even when that is quite irregular; the stone is never dressed or flattened to bring the cups on a level; none show any marks of work, but are the rough blocks or slabs in their natural state.

Many of the holes are roughly pecked in, but the larger ones are usually quite smooth, as if ground out, and almost complete hemispheres. They range from a pit only started or going scarcely beyond the surface to one 2 inches in diameter. The smaller ones with one cup pass into the pitted stones. Occasionally at the bottom of a large cup there is a small secondary hole as though made by a flint drill.

The polished cups may have been used for fire-drill or spindle sockets, though why there should be a number of holes when but one could be used at a time awaits explanation. The rough ones may have been for holding nuts, and so long as they were on the same plane any number could be utilized; but when they are on different parts of the stone, even on opposite sides, as many of them are, the question remains open. Slabs or thin pieces nearly always have cups on both sides, while blocks or thick slabs have them on one side only. On the

[1] Adair, James; American Indians, p. 409

[2] Lawson, John; History of North Carolina, p. 53.

[3] Antiquities of the Southern Indians, pp. 315–320.

[4] Fossil Men and Their Modern Representatives, p. 112.

former a number of nuts could be cracked with one blow of a flat stone and thrown into a receptacle of some kind, either side of the stone being used at pleasure; but there would be no economy of time or work in this method, and it would be very strange that any one should not learn with so much experience that a nut should never be laid on the flat side in cracking. No theory yet advanced accounts for the greater number of such relics, namely, the irregular fragments of stone with cups at varying intervals and different levels.

No division can be made in regard either to size or material of the stone, or to form or finish of the cups. Many of the smaller ones were no doubt paint mortars. One well finished specimen of this class is shown in figure 89; it is of quartzite from 4 feet beneath the surface in Crittenden county, Arkansas.

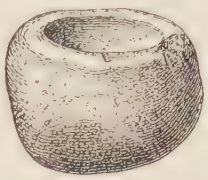


FIG. 89.—Cupped stone or paint cup.

Cupped stones are found wherever representatives of the Bureau have worked, and numerous references might be given concerning their existence in other localities.

MULLERS.

The objects known as mullers are generally flat and smooth on one side and convex on the other, sometimes with a pit in one side or both, mostly of granite, quartzite, or sandstone; rarely of other materials.

A fine specimen of white quartz from Elmore county, Alabama, has the bottom flat and highly polished, the edge perpendicular to bottom and rounding off into the slightly convex top, with a pit at center. Figure 90 represents a muller of marble or crystalline limestone from a grave in Randolph county, Illinois. It has a smooth, flat bottom, with convex top somewhat smaller than the base; around the circumference there is a depression polished by wear. A similar specimen, of diorite, from Carter county, Tennessee, seems to be the lower part of a pestle with expanding base, whose top or handle has been lost, the part remaining having a place for a handle pecked around it.

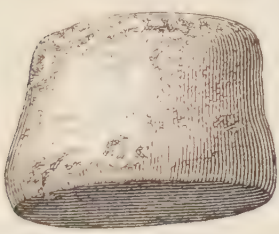


FIG. 90.—Muller, showing polished surface.

The discoidal stones with this shape were probably used as mullers; they were also used as pestles in the hollow mortars, as the edge is often chipped or pecked, which would account for the pits on the faces. Figure 91 represents a muller of granite from Savannah, Georgia. Sometimes the base has an elliptical instead of a circular outline, as seen in other specimens from Savannah.

Mullers are found wherever there are indications of occupancy for any considerable length of time.

GRINDING AND POLISHING STONES.

Stones evidently used for grinding and polishing need only to be mentioned, as they are of widespread occurrence. Implements used for the

former purpose are made of any siliceous stone of convenient size and suitable texture, from a coarse quartzite to a very fine close-grained sandstone, according to the class of work to be done. The markings on them range from the narrow, sharp, incised lines due to shaping a small ornament, to the broad grooves resulting from grinding an ax or celt into form. Nearly all of those in museums are small specimens used for rubbing; but there are many large blocks in various localities, sometimes several feet square, marked and scored in every direction by grinding or sharpening the large implements on them.

Among the polishers may be included a number of small pebbles of very hard siliceous stone, generally some form of quartz, which by the high polish show long use. The larger ones may have been used for rubbing skins in tanning, as they can easily be grasped in the hand. Very few have changed from their primitive form to a greater degree than would naturally result from the wear upon them. A few very

FIG. 91.—Muller, showing polished surface.

small ones, long-ovoid in shape, usually not over $2\frac{1}{2}$ or 3 inches in length, were probably paint mullers, as they are well fitted for use in small paint cups. Many of the discoidal stones—which will be spoken of under the proper head—may have had these functions. The highly polished specimens are all from the southern states. There is one rubbing stone of pumice from Craighead county, Arkansas.

HAMMERSTONES.

Hammers or hammerstones show every stage of work, from the ordinary pebble or fragment, with its surface scarcely altered, to the highly polished round or ovoid "ball." They are usually of the hardest available material, and seem to be of more frequent occurrence in the northern districts than in the southern states, though found everywhere. Used in their earlier stages merely as tools with which to fashion other implements, they were assigned to specified purposes when brought to a better finish or form. A typical example, shown in figure 92, is of granite, from Ross county, Ohio.

The Sioux used an oval stone, with a piece of rawhide covering all

but the point and attaching it to a withe handle,[1] while the Shoshoni and Ojibwa made use of a round stone, wrapped in leather, attached by a string of 2 inches to a handle 22 inches long covered with leather; this was called a poggamoggan.[2] Rounded stones are said to have been used by the California Indians as bolas,[3] though it is more probable that they were slung-shots. The ancient Californians worked out a round stone for an acorn-sheller; the present Indians use any smooth stone.[4] Elaborately carved round stones, mounted in handles as clubs, are known to have been used by the Queen Charlotte island Indians for killing fish,[5] and other northwestern Indians have been observed to use a round stone inclosed in a net and attached to a line as a sinker.[6]

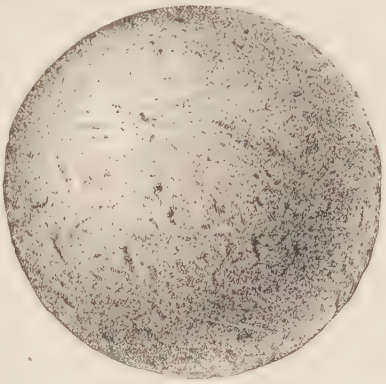


FIG. 92.—Hammerstone.

It is not necessary to quote references to the well-known fact that the Eskimo and the Patagonians made use of round stones of various sizes as bolas. There is no evidence that our Indians ever used anything of the sort.

GROOVED STONES OTHER THAN AXES.

Three subclasses of grooved stones, differing in essential features from axes, may be discriminated. They are as follows:

A. Slightly or not at all worked, except the groove; often showing marks of violent usage. With these may be classed the large stone hammers of the Lake Superior region.

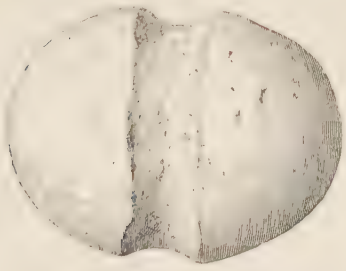


FIG. 93.—Grooved round stone.

B. Round or ellipsoid stones; in the latter the groove may follow either axis. The type (figure 93) is of sandstone from Carter county, Tennessee.

C. Resembling axes in all but the edge.

Of class *A* there are none in the collection; their form and size are such that they could have been for no other purpose than hammerstones. Of class *B* there are some from Savannah, which may be sinkers or club heads. According to Morgan, oval stones with grooves were secured in the heads of war clubs,[1] and Carver observed that the southwestern Indians used as a slung-shot a curiously worked stone, with a string a

[1] Dodge; Our Wild Indians, plate I, fig. 3.
[2] Lewis and Clarke; Travels, p. 425.
[3] Powers; Contributions to N. A. Ethnology, vol. III, p. 52.
[4] Ibid., p. 433.
[5] Dawson; Fossil Men, p. 119.
[6] Stevens; Flint Chips, p. 95.

yard and a half long tied to it, the other end being tied to the arm above the elbow.[2]

The specimens of class *C* may be broken axes. Figure 94 (granite, from Butler county, Ohio) shows a form quite common throughout central and western Ohio. They are generally small, have evidently never been sharp, and were in all probability intended for hammers from the beginning.

Mortars.

The Indian mortars in the collection are nearly always of sandstone of varying degrees of fineness. As is the case with cupped stones, when made of slabs, both sides have been worked; when of rough blocks, only one.

The Senecas and Cayugas are said by Morgan to have used wooden mortars in which to pound corn after it was hulled,[3] and it is possible that the long pestles of soft stone were used with wooden mortars, though some are not well adapted to this use. The Iroquois women pounded in stone mortars the stony material used in tempering the clay for their pottery.[4] The California Indians made mortars by knocking a segment off a bowlder, making a flat surface, and working out with a hammer and chisel,[5] while the tribes of the interior worked directly from the surface of a suitable rock. The Yokuts, according to Powers, use tolerably well made stone mortars, and sometimes place a basket-like arrangement around the top to prevent the acorns from flying out.[6]

FIG. 94.—Grooved hammer.

No two specimens of the mortars and metate-like stones in the Bureau collection are alike; the nearest approach that can be made to a classification is as follows:

A. Smooth and flat on one or both sides; for use with mullers; from McMinn county, Tennessee, and Allamakee county, Iowa.

B. With round cavities on one or both sides; for round or cylindrical pestles; from McMinn county, Tennessee. A cobblestone from Bradley county, Tennessee, has a shallow cavity in either side and a pit in the center of each. From Kanawha valley there is a slab weighing about 25 pounds, flat and smooth on one side, as though primarily used with a muller and the regular even cavity afterward made; on the other side a cavity and a cupped hole have been worked in from the natural surface. A slab from Warren county, Ohio, has a shallow cavity worked into one side and a cupped hole in the other. From Union county,

[1] League of the Iroquois, p. 359.
[2] Carver, Jonathan; Travels in North America, p. 191.
[3] Report to Regents of the Univ. of New York, vol. II, p. 86.
[4] Schoolcraft, Notes on the Iroquois, p. 239.
[5] Schumacher, 11th Ann. Rept. Peabody Museum, p. 264.
[6] Powers, Contributions to N. A. Eth., vol. III, p. 377.

Mississippi, there is a flattened bowlder with a shallow cavity on each side; a shallow cup has been pecked on the edge of one of them. From Caldwell county, North Carolina, comes a bowlder of water-worn mica-schist, with a shallow cavity and a deeper one on one side, and on the other a cupped hole opposite each of these cavities.

C. With one side hollowed out, the other flat and smooth. Specimens of this type come from Caldwell county, North Carolina; McMinn county, Tennessee, and Bradley county, Tennessee, the last with a pit in the center and another on the edge of the flat side.

D. With a long, narrow depression on each side. A very large specimen of fine-grained sandstone from Lincoln county, Arkansas, represents this type.

There are, in addition, two pieces of fine-grained sandstone with uniform thickness of less than an inch and about 10 inches across, from Kanawha valley, West Virginia, and Hale county, Alabama, respectively. Both sides are ground perfectly smooth and flat. The objects were probably for some culinary purpose.

Sinkers.

The sinkers in the collection may be divided into four classes, viz: *A*, entirely unworked; *B*, notched on the sides; *C*, encircled by a groove; and *D*, perforated. Conversely, stones under all these different heads may have served other and widely different purposes.

Of the functions of class *A*, only those who have seen them in use can speak. Stevens mentions that some tribes inclose a round stone in a sort of net and attach it to a line in fishing;[1] and no other use can be imagined for some of the specimens in the Bureau collection.

Specimens of class *B* are found along water courses in such situations as to leave no doubt of their use as sinkers;[2] they were attached to grapevines and dragged on the bottom of streams to frighten fish into nets or traps.[3] Those in the collection are made of ordinary flat water-worn pebbles, with notches rudely chipped in the sides; a number are from southeastern Tennessee.

Of class *C*, while many were perhaps sinkers, more were club heads and slungshots or hammers. A number have been obtained from Savannah, Georgia, more or less worked, some being rounded, with grooves of varying depths and sizes. Small stones of this form are used by Greenland fishermen as sinkers;[4] and according to Thatcher, a large stone is by the Indians made fast to a sinking line at each end of a net, and the net is spread in the water by sinkers at different parts of it.[5]

Class *D* will be referred to under the head "Perforated stones," from which they can be discriminated only arbitrarily.

[1] Flint Chips, p. 95.
[2] Abbott, C. C.; Primitive Industry, chap. 28.
[3] Jones, C. C.; Antiquities of the Southern Indians, p. 338.
[4] Nilsson, S., Stone Age, p. 25.
[5] Thatcher, B. B.; Indian Traits, vol. I, p. 70.

A number of roughly chipped, somewhat crescent-shaped specimens of argillite, from half a pound to 2 pounds in weight, collected in Montgomery county, North Carolina, may have been used as sinkers.

Perforated Stones.

Only the larger or rougher perforated stones used as implements are included in this class.

Several perforated pieces of steatite, some mere rough fragments, others with the edges smooth and dressed to a somewhat symmetrical outline, have been collected about Savannah, Georgia. Some of these have been drilled, others gouged through apparently with a slender flint. In the latter group the little projections left by the tool have been worn smooth. The hole may be near one end or about the center. Similar pieces have been found in Forsythe county, Georgia; one of these is worked to an irregular pentagon and smoothly finished. From Haywood county, North Carolina, there are some very rough fragments, apparently just as they were picked up, except for the perforation; and a number of pieces of perforated pottery are from Montgomery county, North Carolina.

Perforated stones were used by the southern Indians to drag along the bottoms of streams and frighten fish into their nets and traps.[1] Four disks 4 to 5½ inches in diameter, with handles from 13 to 17 inches long, were found in a cave at Los Angeles, California,[2] and objects of this character were, according to Schumacher, used by the Santa Barbara Indians as weights for wooden spades.[3] According to Abbott many perforated stones are found close to rivers and on shores in such positions as to leave no doubt of their use as sinkers.[4] Similar stones were used as sinkers by the Scandinavians in comparatively recent times; by the Bechuanas for grinding grasshoppers, spiders, etc., and also as weights for digging-sticks; by some savages in the Pacific islands as clubs; by the Icelanders for breaking up salted fish.[5] They were used by the Iroquois as weights for fire drills;[6] by the Eskimo as clubs, having a rawhide handle secured by a knot.[7] According to Dale,[8] Layard,[9] Griesbach,[10] and Gooch,[11] they were used by natives of southern Africa as root-diggers (to remove earth from the roots), as weapons, and to give weight to digging-sticks. They were also used by the Peruvian Indians to be thrown with a stick. Disk-shaped and

[1] Jones; Antiquities of the Southern Indians, p. 338.
[2] Amer. Naturalist, vol. xx, p. 574.
[3] Hayden Surv., Bull. 3, 1877, p. 41; also 11th Ann. Rept. Peabody Museum, p. 265.
[4] Primitive Industry, p. 244.
[5] Stevens; Flint Chips, p. 95.
[6] Ibid., p. 96. Morgan; League of the Iroquois, p. 381.
[7] Stevens; Flint Chips, p. 499.
[8] Dale, L., in Journal of Anth. Inst. of Great Br. and Ireland, vol. I, p. 347.
[9] Layard, E. L., in ibid., appendix, c.
[10] Griesbach, C. L., in ibid., p. cliv.
[11] W. D. Gooch says they were used as club heads by the predecessors of the Bushmen, who now use them as diggers; ibid., vol. xi, p. 128.

cylindrical throwing stones, perforated for the stick, are found among the Swiss lake dwellings.[1] According to Evans[2] they were used mostly as hammers or clubs. They are hard and battered on the edges; sinkers would be of softer stone.

The most complete article that has yet been given concerning the forms and uses of perforated stones is that by H. W. Henshaw.[3]

Discoidal Stones.

There are numerous references to discoidal stones by various writers, but a majority of the objects do not fall under any explanation that has so far been given.

The Choctaw Indians used disks two fingers wide and two spans around in playing "chungke,"[4] and the Indians of North Carolina were much addicted to a sport called "chenco," played with a staff and a bowl made with stone.[5] The same kind of game was, or still is, played with hoops or rings of wood or rawhide by the Iroquois,[6] the Pawnee,[7] the Apache,[8] the Navajo,[9] the Mohave,[10] and the Omaha;[11] also, with rings of stone, by the Arikara,[12] the Mandan,[13] and other tribes.

The game of chungke, however, will account for only a small part of the great number of stones of this form. The Indians of southern California, in manufacturing pottery, make the clay compact and smooth by holding a rounded and smooth stone against the inside.[14] The Fijians, in making pottery, use a small, round flat stone to shape the inside,[15] while the Indians of Guiana use ancient axes or smooth stones for polishing the clay in making their vessels.[16] According to Evans,[17] pitted disks were used as pestles, hammers, or mullers; a thick one with pitted ends was found in a mortar at Holyhead.[18] Under the head of pestles and of perforated stones further references will be found that may apply as well to this form of implements.

No kind of relic is more difficult to classify. From the smooth, symmetrical, highly-polished chungke stone they gradually merge into mullers, pestles, pitted stones, polishers, hammers,[19] ornaments, and

[1] Knight, E. H., in Smithsonian Report for 1879, p. 232.
[2] Stone Implements, p. 194.
[3] Bul. Bur. of Eth., "Perforated Stones from California."
[4] Adair, American Indians, p. 402.
[5] Lawson; History of North Carolina, p. 98.
[6] Morgan; League of the Iroquois, p. 299.
[7] Irving, J. T.; Indian Sketches, vol. II, p. 142.
[8] Cremony, J. C.; Life Among the Apaches, p. 302.
[9] Matthews, W.; Smithsonian Report for 1884, p. 814.
[10] Report of Pacific Railroad Survey, vol. III, p. 114.
[11] Long; Expedition to Rocky Mountains, vol. I, p. 205.
[12] Brackinridge, H. M.; Views of Louisiana, p. 256.
[13] Catlin; North American Indians, vol. I, p. 132.
[14] Schumacher, in Twelfth Annual Report Peabody Museum, p. 522.
[15] Lubbock; Prehistoric Times, p. 648.
[16] Im Thurn in Jour. Anth. Inst. Gt. Br. and Ireland, vol. II, p. 647.
[17] Stone Implements, p. 218.
[18] Ibid., p. 227.
[19] For any or all of which purposes they may have been used in the course of their manufacture.

the ordinary sinker or club-head, so that no dividing line is possible. Theories constructed on a basis of their use may be far from correct.

They present various forms and degrees of finish; many have the natural surface on both sides with the edge worked off by grinding or pecking, the latter being produced probably by use as a hammer; the sides may be ground down while the edge remains untouched; or the sides may be pecked and the edge ground, being probably of a thick pebble originally. Some of the finer grades, as chalcedony and quartz, that have received the highest finish, appear to have had all the work done by grinding or rubbing, as even those only slightly worked bear no signs of hammering or pecking. When of the harder materials they are generally made of water-worn pebbles as nearly the desired form as can be found; in fact, some specimens which are in their natural state, entirely unworked, require a very close examination to dis-

FIG. 95.—Discoidal stone.

tinguish them from others whose whole surface has been artificially produced. In the jasper conglomerates from Arkansas, however, there is a regular series from a roughly chipped disk to one of the highest polish and symmetry. The larger ones of quartz, particularly those with concavities in the sides, must have been patiently wrought for years before brought to their present state. Many of the smaller ones, especially sandstone, seem to have been designed for grinding or polishing.

The following groups are represented in the collection:

A. Sides hollowed out, edge convex; 2 to 6 inches diameter, seven-eighths to $2\frac{3}{4}$ thick.

1. Edges of concavity sharp.

a. Cavity a regular curve from side to side. The type (figure 95) is of quartz, from Cherokee county, Georgia. There are also, from Kanawha valley, West Virginia, one of sandstone, of which one side has been worked out by a flint, the little pits being distinctly visible, while the other side has natural surface; from Loudon county, Tennessee, one of

quartzite, 6 inches diameter, which has been used as a mortar, the cavities being roughened, with their edges broken and scarred (the edge of the stone is battered entirely around midway between the sides as though used for a hammer); from McMinn county, Tennessee, one of quartzite, about the same size as last, with a slight pit in the center of each cavity, the edges of the concavity being considerably chipped, and the edge of the implement very smooth; from Polk county, Tennessee, one of quartzite, 3½ inches in diameter, with the edge polished except in

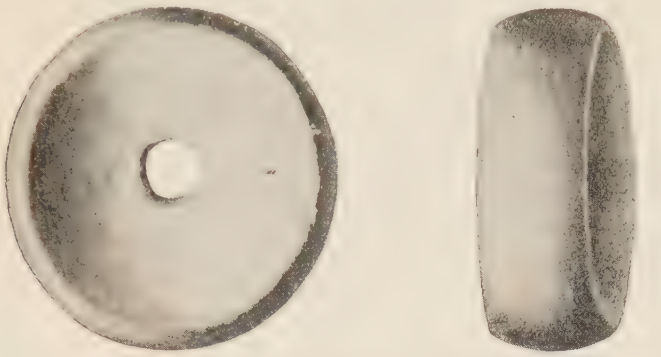


FIG. 96.—Discoidal stone, with perforation.

one spot, where it shows marks of use as a hammer or pestle—it has been used also as a mortar, the edges of the concavity being much chipped and broken; one each from Craighead county, Arkansas, of novaculite; Randolph county, Illinois, of granite; Cherokee county, Georgia, of quartz; and Obion county, Tennessee, of sandstone. In the four last mentioned the entire surface is quite smooth or even highly polished.

b. With a small perforation at the center. The type is shown in figures 96 (of sandstone, from a grave in Union county, Illinois), and 97 (of granite, from Virginia). There is another specimen, of sandstone, from Red River county, Texas.

FIG. 97.—Discoidal stone, with perforation.

c. With a secondary depression in each cavity. Figure 98 (yellow quartz, highly polished, from Fulton county, Georgia) is typical. There is also one of quartzite, with a secondary depression in one side only, from Roane county, Tennessee, which may be supposed, from this and other imperfections, to be unfinished.

2. Edges of concavity rubbed off blunt. These are grouped simply by form, as the specimens from Kanawha valley, West Virginia, and northeastern Kentucky are nearly all roughly finished, quite different

from the smooth or polished ones from farther south. Some are worked out into the form of a ring, and there is every stage between that form and the flat disk whose sides show no trace of pecking. Figure 99

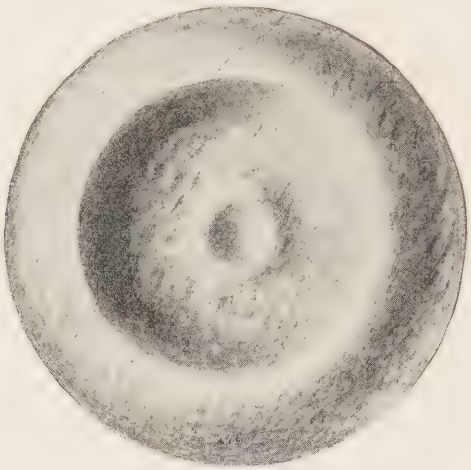


FIG. 98.—Discoidal stone, with secondary depression.

FIG. 99.—Discoidal stone, in form of a ring.

(quartzite, from Sevier county, Tennessee) illustrates a typical example, roughly worked but entirely perforated, and figure 97 shows the same type in another form.

District.	Quartz.	Novaculite	Flint.	Quartzite.	Sandstone.	Granite.
Caldwell county, North Carolina	1					
Crittenden county, Arkansas		1				
Drew county, Arkansas				1		
Randolph county, Illinois			1	2		
Eastern Tennessee	1			1		
Bartow county, Georgia				1		
Kanawha valley, West Virginia				1	1	1
Northeastern Kentucky					22	

B. Flat or slightly concave sides, edges straight and at right angles to the sides ; diameter, 1⅝ to 5 inches. The type shown in figure 100

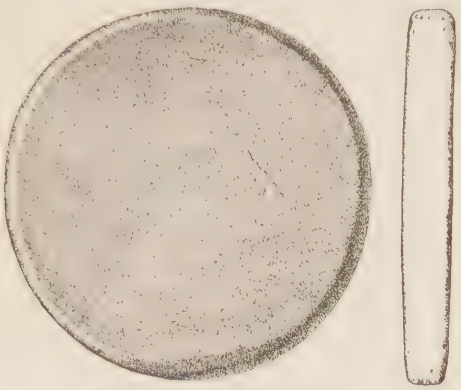


FIG. 100.—Discoidal stone.

is of sandstone from Lauderdale county, Alabama.

District.	Sandstone.	Quartzite.	Very fine schist.	Yellow jasper.	Argillite.
Lauderdale county, Alabama	1				
Mississippi county, Arkansas		1	1	1	
McMinn county, Tennessee	1				4
Kanawha valley, West Virginia	1				

C. Sides flat; edges straight, sometimes rounding off into the sides; diameter, 2¼ to 6 inches; thickness, three-quarters to 2¼ inches. A

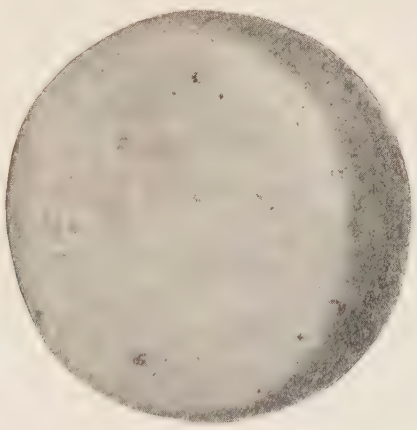


FIG. 101.—Discoidal stone.

number from southeastern Tennessee, especially the smaller ones, are quite rough, being merely pecked or chipped into shape with no subse-

quent rubbing. Figure 101 (chalcedony, from a mound in Monroe county, Tennessee) represents the type. The material is variable.

District	Quartz.	Sandstone.	Argillite.	Chalcedony.	Limestone.	Marble.	Granite.	Jasper conglomerate.	Quartzite.
Southeastern Tennessee		5	5	1	3	1			9
Western Tennessee		1			1				
Savannah, Georgia	1						7		1
Mississippi county, Arkansas								1	

D. Like the last, except much smaller. Very few are polished over the entire surface; some are rubbed more or less on the edges or sides, but a majority have the edge rough as it was chipped or pecked out; many have either the edge or sides in the natural state. From those smoothly polished to those very rudely worked the gradation is such that no dividing line can be drawn. This is true, also, of the smaller specimens of other types. Some of the quartzite specimens are very loose in texture. From seven-eighths to 2 inches in diameter and one-fourth to three-fourths of an inch thick.

District.	Marble.	Sandstone.	Argillite.	Granite.	Red jasper.	Quartzite.	Micaceous sandstone.	Limestone.	Quartz.	Cannel coal.
Eastern Tennessee	1	54	64			32	1	12	4	
Bartow county, Georgia		1		1	1	4				
Savannah, Georgia			2							
Kanawha valley, West Virginia		7				20				1
Northeastern Kentucky		14						5		

E. Convex on both sides, edges straight. One of white quartz from Caldwell county, North Carolina, has the sides much curved, making

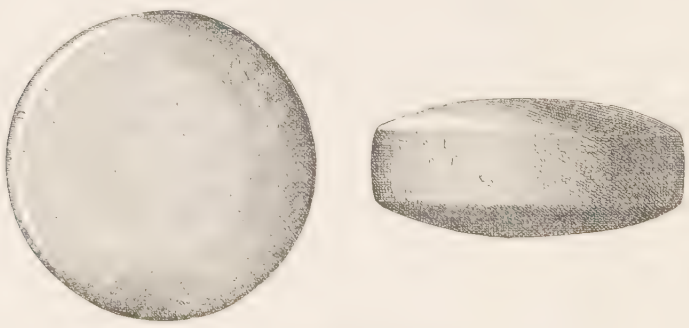


FIG. 102.—Discoidal stone, convex.

the stone very thick in proportion to its width; there is a deep pit on each side, the entire surface being highly polished. Diameter, 2 to 3½

inches; thickness, three-fourths to an inch and a half. Illustrated by figure 102 (of porphyry, from a grave in Caldwell county, North Carolina).

District	Yellow jasper.	Iron ore.	Mica schist.	Novaculite.	Jasper conglomerate.	Quartzite.	Quartz.	Hornblende.	Marble.	Clayey limestone.	Argillite.	Sandstone.	Limestone.	Steatite.	Granite.	Chalcedony.	Steatite.	Black flint.	Porphyry.
Eastern Arkansas	3	1	1	1	4	7	...	1	...	...	...	7	1	...	...	1	...	...	...
Eastern Tennessee (many of these rough and entirely without polish)	...	...	1	...	...	38	29	...	1	1	31	27	8	1	1	2	...	...	...
Kanawha valley, West Virginia (rough)	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...
Savannah, Georgia	...	...	...	...	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...
Union county, Mississippi	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...
Caldwell county, North Carolina	...	...	...	...	...	1	10	...	...	...	...	4	...	...	1	2	1	2	1

F. Same form as the above; $1\frac{1}{4}$ to 2 inches in diameter, one-half to seven-eighths of an inch thick.

District.	Jasper.	Mica schist.	Micaceous sandstone.	Quartzite.	Quartz.	Marble.	Argillite.	Sandstone.	Limestone.	Steatite.
Elmore county, Alabama	...	...	...	2	1	...	...	1	...	1
Western North Carolina	...	...	...	1	...	...	2	...	...	...
Eastern Tennessee	...	...	...	2	...	1	9	...	1	...
Bartow county, Georgia	1	1	1	2	...	...	...	...	...	...
Savannah, Georgia	...	...	...	3	...	...	...	...	...	...
Kanawha valley, West Virginia	...	...	...	...	...	...	...	4	...	...
Drew county, Arkansas	...	...	...	1	...	...	...	...	...	...

G. Flat or slightly convex on one or both sides, edge straight, one side wider than the other. Some have the edge battered or chipped,

FIG. 103.—Discoidal stone.

and it is always at the angle of the edge with the wider side. From $1\frac{5}{8}$ to $3\frac{1}{2}$ inches in diameter, and three-fourths to an inch and a half

thick. The specimen shown in figure 103 (of compact quartzite, from Bartow county, Georgia) is typical. The material is quite diverse.

District.	Sandstone.	Marble.	Quartzite.	Quartz hornblende.	Granite.	Quartz.	Compact quartzite.	Syenite.	Chalcedony.	Schist.	Flint.
Eastern Tennessee	2	1	2			2		1			
Savannah, Georgia			1	3							
Bartow county, Georgia							1	1			
Kanawha valley, West Virginia	2				1						
Caldwell county, North Carolina					3					1	2
Mississippi county, Arkansas											1

There are also of this type, one of very hard black stone (not identified) from Red River county, Texas, three-fourths of an inch in diameter; one of barite from Bartow county, Georgia, one inch in diameter, three-fourths inch thick; and one of granite, from Chester county, South Carolina, an inch in diameter. There are also one of quartzite from Drew county, Arkansas, with a shallow pit on each side; one of

FIG. 104.—Discoidal stone.

the same material from southeastern Tennessee, with a deep pit gouged in smaller side; and from the same locality, three of quartzite, one of quartz, and one of sandstone, each with a deep pit in the larger side. All of these are small and none of them polished.

H. Convex sides and curved edges; size as in group *G*. The type (figure 104) is of quartz, from Caldwell county, North Carolina.

District.	Jasper conglomerate.	Quartz.	Limestone.	Quartzite.	Sandstone.	Conglomerate.
Catahoula parish, Louisiana						1
Eastern Tennessee		1	2	3		
Caldwell county, North Carolina		2			1	
Northeastern Arkansas	1		1			

I. Same form, rough and not polished; 1 to $2\frac{3}{4}$ inches in diameter, one-half to 1 inch thick.

District.	Quartzite.	Flint.	Yellow jasper.	Argillite.	Quartz.	Sandstone.
Eastern Tennessee	50			3	11	10
Northeastern Arkansas	1		3			8
Caldwell county, North Carolina						1
Kanawha valley, West Virginia	36	1				

J. Sides slightly convex, edge slightly curved; $2\frac{1}{4}$ to $3\frac{1}{2}$ inches in diameter, three-quarters to an inch and a half thick.

District.	Sandstone.	Quartz.	Quartzite.	Chalcedony.	Argillite.	Clayey limestone.	Steatite.	Sienite.
Kanawha valley, West Virginia (evidently used for a hammerstone)	1							
Eastern Tennessee	2	3	4	1	2	1		
Lauderdale county, Tennessee			1					
Caldwell county, North Carolina		2					1	
Fulton county, Georgia								1

K. Sides flat; edges convex; roughly finished, no polish; $1\frac{1}{8}$ to $2\frac{1}{4}$ inches in diameter, three-eighths to three-fourths of an inch thick.

District.	Sandstone.	Quartz.	Quartzite.
Kanawha valley, West Virginia	1		1
Eastern Tennessee	4	1	7

L. Not polished; roughly chipped edges; 2 to $3\frac{1}{2}$ inches in diameter.

District.	Sandstone.	Quartzite.	Chalcedony.	Yellow jasper.
Mississippi county, Arkansas	1	1	1	3
Bartow county, Georgia		1		
Union county, Mississippi	3			

M. Edges V-shape; $1\frac{3}{4}$ to $2\frac{1}{2}$ inches diameter, 1 to $1\frac{1}{2}$ inches thick. The type (figure 105) is of granite, from Randolph county, Illinois, with insunk pecked sides and polished edge. A specimen from Kanawha valley, West Virginia, is of flint, with only the edge worked; appar-

ently a hammer. One from Craighead county, Arkansas, has flat sides and the entire surface polished; another from McMinn county, Tennessee, is also polished entire. A good specimen from Cocke county, Tennessee, is of flint, one side rubbed flat, the other a rounded cone, highly polished.

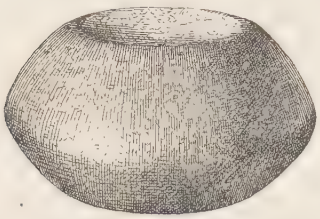


FIG. 105.—Discoidal stone, with V-shaped edges.

N. Sides hollowed out; edges straight or slightly curved; very thick; used as mortars, hammers, or pestles. This form gradually merges into disk-shaped, pitted, or entire-dressed hammers, which in turn run into the ordinary hammerstones. The types are figures 106 (quartzite, from Bradley county, Tennessee) and 107 (quartzite, from Nicholas county, Kentucky). There are in this group from eastern Tennessee three of quartzite, $2\frac{1}{4}$ by $4\frac{1}{2}$ inches, $4\frac{1}{4}$ by $5\frac{3}{4}$ inches, and $1\frac{3}{4}$ by $3\frac{1}{4}$ inches, and one of granite, $2\frac{3}{4}$ by 3 inches; from Caldwell county, North Carolina, one of granite; and from Montgomery county, North Carolina, three of quartzite. The last four are evidently hammers or pestles. In addition there is a specimen from Jackson county, Illinois, of ferruginous sandstone, 3 inches in diameter. On one side there is a pit and on the other a shallow, mortar-like cavity extending entirely across.

FIG. 106.—Discoidal stone, used as mortar.

FIG. 107.—Discoidal stone, probably used as hammer.

O. One side flat, the other rounded; of convenient size for grasping. In some the bottom is quite smooth. There is sometimes a pit in one or both sides, more frequently in the bottom. They were used as mullers or pestles; in the latter, either the side or the edge may have been the pounding surface. The line between these implements and the cylindrical, dome-topped pestles can not be drawn (see figure 91).

District.	Quartzite.	Quartz.	Sandstone.	Granite.
Eastern Tennessee	1	2		
Southwestern Wisconsin	2		1	1
Kanawha valley, West Virginia	1			
Crittenden county, Arkansas	1			
Jackson county, North Carolina	1			
Warren county, Ohio				1
Savannah, Georgia	2	1	2	8

P. Sides flat; edge convex; same size and use as last.

District.	Quartzite.	Quartz.	Sandstone.	Granite.
Southeastern Tennessee		1	1	
Kanawha valley, West Virginia	3		5	
Warren county, Ohio				1
Madison county, Alabama			1	

Q. From southeastern Tennessee and northwestern Georgia there are many disk-shape fragments of pottery, small, thin, and coarse, with the edges roughly chipped; and from northeastern Kentucky there are similar pieces, except that they have been fashioned from fragments of limestone and sandstone. These specimens are illustrated by figure 108 (pottery, from a mound in Bartow county, Georgia).

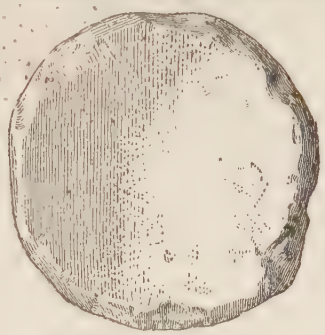


FIG. 108.—Discoidal pottery fragment.

SPUDS.

It has been a puzzle to archeologists to assign to any class the peculiar stones called "spuds." They are usually of a comparatively soft material, carefully worked and polished, and bear no marks of rough usage. On the other hand, they seem too large for ornament. Perhaps their office may have been in some ceremony or game. Something similar in form seems to be denoted in the following extracts:

Col. James Smith[1] says, speaking of the Indians of western Pennsylvania, that as soon as the elm bark will strip in spring, the squaws, after finding a tree that will do, cut it down, and with a crooked stick, broad and sharp at the end, take the bark off the tree, and of this bark make vessels. The Twana Indians, who formerly lived at the south end of Hoods canal, Washington, in barking logs use a heavy iron implement about 3 feet long, widened and sharpened at the end;[2] and the tanbark workers of our day use an instrument of somewhat similar form.

The ordinary spud is too weak to endure such usage, though it is claimed by old people living in the Shenandoah valley, Virginia, that in the last century the Indians in that locality used an implement of this pattern for stripping the bark from trees. The implement may have been used in dressing hides, the hole being for attachment of a handle.

[1] Captivity Among the Indians, Lexington, 1799; reprinted, Cincinnati, 1870, p. 36.
[2] Eells, Myron; Hayden Surv., Bull. 3, 1877, p. 81.

A celt of argillite, highly polished, from Loudon county, Tennessee, of the pattern shown in figure 64, has a neatly drilled cylindrical hole about a third of the way from the top; but such cases are unusual. The spuds may be divided into three general classes, as follows:

FIG. 109.—Spud.

A. Blade circular in outline, including 180 degrees or more, or semielliptical with either axis transverse; sides of stem straight or slightly curved, parallel or slightly tapering to top, which is either straight or slightly rounded; shoulder nearly at right angles to stem, with sharp or rounded corners or sometimes barbed; stem and blade not differing greatly in length. The type of the class, presented in figure 109, is of clay slate, from a mound in Monroe county, Tennessee. The other six specimens in the collection were distributed as shown in the table.

District.	Green slate.	Mica-schist.	Compact quartzite.	Clay slate.	Quartzite.
Western North Carolina	1	1			1
Monroe county, Tennessee			1	1	
Phillips county, Arkansas					1
Pulaski county, Arkansas					1

B. Lower part of the blade a half circle or less; top square or slightly rounded; stem rapidly widening, with increasing curve to the blade, making an angle with it; stem and blade nearly the same length. A specimen of green slate, from Mississippi county, Arkansas, is illustrated in figure 110. Another, of compact quartzite, comes from Loudon county, Tennessee.

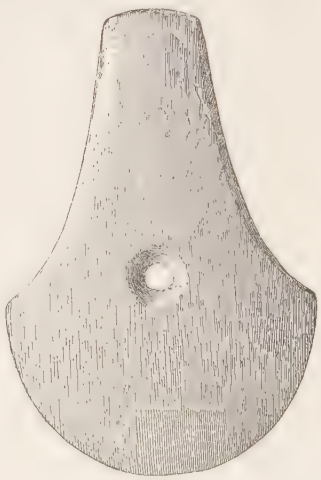


FIG. 110.—Spud.

C. Handle or stem round; very much longer than the blade, which is semicircular or semielliptical, with square or barbed shoulders. Illustrated in figure 111 (probably of chloritic slate, from Prairie county, Arkansas).

PLUMMETS.

The specimens known as plummets vary considerably in form, size, and degree of finish, indicating diversity of purpose, and different writers have assigned to them various uses.

According to Abbott, one of these relics was found at Salem, in a mortar.[1] Stevens says, quoting from Schoolcraft, that the Pennacook Indians used sinkers very much like a plummet in shape.[2] In Florida very rough plummets with deep grooves are found in the shell mounds, which were no doubt used as sinkers. The Indians of southern California use them as medicine stones to bring rain; the Eskimo use similar stones as sinkers, but have them perforated at the end. The larger objects of this form may have been used as pestles.[3] They might be made very efficient in twisting thread, as they revolve for a considerable time when set in motion.

FIG. 111.—Spud.

The general form is ovoid, sometimes quite slender, sometimes almost round; the ends may be either blunt or pointed. They may be grooved near the middle or near either the larger or smaller end. Some have two grooves, some are only partially grooved, while others have the groove extending lengthwise. There are forms that differ somewhat from this description, but such are rare.

FIG. 112.—Plummet, grooved near one end.

Many small and otherwise unworked waterworn pebbles and pieces of steatite pots from southeastern Tennessee and from Montgomery county, North Carolina, have grooves near the middle or near one end; they were probably applied to some of the uses for which plummets were intended.

FIG. 113.—Plummet, double-grooved.

The plummets in the Bureau collection may be grouped as follows:

A. Grooved near smaller end. The types are illustrated in figure 112 (sandy limestone, from a mound in Catahoula parish, Louisiana), and figure 113 (hematite, double grooved, with notches cut in various places, from a mound in Kanawha valley, West Virginia). Other specimens are, one from Arkansas county, Arkansas, of sandstone, and one each from Brown and Randolph counties, Illinois, both of hematite.

B. Grooved near larger end. A good example, of hematit, is from Kanawha valley, West Virginia, with a second groove partially around the middle.

[1] Primitive Industry, p. 229.

[2] Flint Chips, p. 581.

[3] Henshaw in Amer. Jour. Arch., vol. I, pp. 105–114.

C. Grooved near the middle. The class is represented by a beautiful specimen (figure 114) of hematite, with the groove much polished and irregular, and a deep notch cut in one end, from Ross county, Ohio. Another specimen, from Kanawha valley, West Virginia, is a double conical implement of hematite, elliptical in section with both ends ground off on flatter sides only.

FIG. 114.—Plummet, grooved near middle.

D. Grooved lengthwise. This class includes a plummet of quartzite, from Yellowstone park (figure 115), and another of hematite, much shorter than the Yellowstone specimen and with blunt ends, from Kanawha valley, West Virginia.

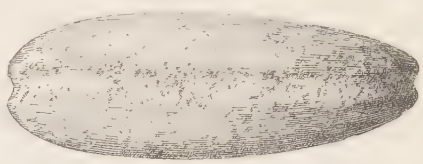


FIG. 115.—Plummet grooved lengthwise.

E. Grooveless. A good specimen (figure 116) is of quartz and mica, elliptical in section, pointed at ends with one end perforated, from Yellowstone park; another, from Randolph county, Illinois, of hematite, rough, perhaps unfinished.

FIG. 116.—Plummet, grooveless, perforated.

F. Double cone, with one end ground off flat and hollowed out. The type (figure 117) is of granite, one of three from Savannah, Georgia.

FIG. 117.—Plummet, double cone in shape.

G. Top flattened and hollowed out; sides incurving to the middle; lower half a hemisphere. The class is represented by figure 118 (quartzite, from Randolph county, Illinois), and figure 119 (sandstone, from Adams county, Ohio). From Kanawha valley there is one of hematite, similar in form to the last.

H. Ovoid, with the smaller end ground off flat.[1] A good specimen of this class (figure 120) is of magnetite, from Caldwell county, North Carolina. From Savannah, Georgia, there are two of sandstone, both smaller than the type and rough; from Kanawha valley there is one of quartzite, nearly half ground away, leaving almost a hemisphere; and from eastern Tennessee there are one of magnetite and one of quartzite, the latter nearly round.

FIG. 118.—Plummet.

I. Cylindrical. A unique specimen, from a mound in Loudon county, Tennessee, is illustrated in figure 121. It is of sandstone; a short cylinder with incurved sides, each end terminating in a blunt cone.

[1] Pear-shaped stones with the smaller end cut squarely off are frequent in Georgia; they are about the size of turkey eggs. Jones, Antiq. Southern Indians, p. 372.

Figure 122 represents a piece of smoothly dressed steatite from Desha county, Arkansas, with a two-thirds round section, the ends rounded, with a groove near one end, which may be classed with the plummets.

FIG. 119.—Plummet.

FIG. 120.—Plummet, end ground flat.

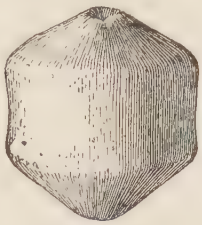


FIG. 121.—Plummet.

There are pieces of sandstone from the same locality which connect this pattern with the simpler "boat-form" stones, except that the flat side is ground smooth instead of being hollowed. This is only one of numerous examples where the shapes of implements whose "typical forms" seem utterly dissimilar merge into one another so gradually that no line of demarkation can be drawn.

FIG. 122.—Plummet, cylindrical.

CONES.

The relics known as "cones" have the base flat and the side curving slightly; usually the curve extends regularly over the top, but sometimes the apex is rubbed off flat. The conic surface may form an angle with the base, or the line of junction may be rounded into a curve. They vary considerably in thickness, some being nearly flat,

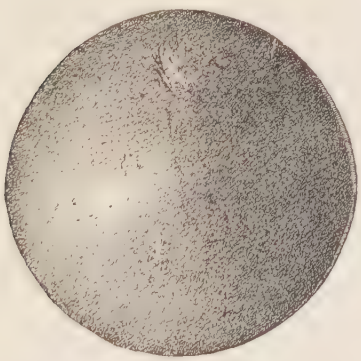


FIG. 123.—Cone.

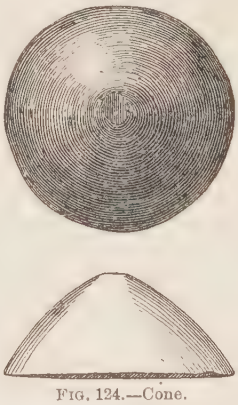


FIG. 124.—Cone.

others having a height equal to the diameter of the base. One of steatit from Savannah, as also one of sandstone from Kanawha valley, has a slight pit or depression on the flat side. Among the best examples are

one (figure 123) of steatite from Bradley county, Tennessee, and another (figure 124) of hematite from Loudon county, in the same state; one (figure 125) of compact quartzite from a mound in Ogle county, Illinois,

FIG. 125.—Cone.

FIG. 126.—Cone.

and a fourth specimen (figure 126) of granite from Kanawha valley, West Virginia. The distribution is as follows:

District.	Steatite.	Hematite.	Compact quartzite.	Granite.	Sandstone.
Eastern Tennessee	3	4			
Ogle county Illinois			1		
Savannah, Georgia	1				
Haywood county, North Carolina		1			
Kanawha valley, West Virginia		1		1	1

HEMISPHERES.

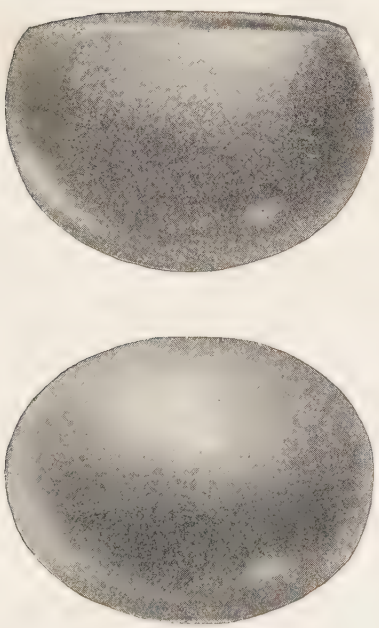


FIG. 127.—Hemispheres.

Hemispheric stones, like the cones, can receive a name only from the form and not from any known or imagined use to which they could have been applied.

All such specimens in the collection, except one, are from Kanawha valley, and of hematite; many if not most of them have been ground down from the nodule, and were probably paint stones originally; at least, the material rubbed from them was used as paint while the maker had their final form in view. One, however, has been pecked into shape and is entirely without polish. In all, the base is flat and varies in outline from almost a circle to a narrow ellipse. A section of the stone parallel to either axis of the base varies from a little more to a little less than a semicircle Typical forms, both from Bracken county, Kentucky, are illustrated in figure 127.

The specimen illustrated in figure 128 (yellow quartz, from a mound in Kanawha valley) is intermediate between cones and hemispheres. The sides are polished, while the flat bottom and rounded top are roughened. As it has faint red stains, it may have been used as a paint-muller.

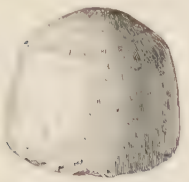


FIG 128.—Hemisphere.

PAINT STONES

The articles known as paint stones scarcely come under the head of implements. Some of the hematite pieces are incipient celts, hemispheres, or cones; but most of them were used merely to furnish paint, at any rate until rubbed down quite small. They are of every degree of firmness, some being as brittle as dry clay, others like iron. Most pieces in the collection are from Kanawha valley, but others are from southeastern Tennessee, northeastern Arkansas, and Caldwell county, North Carolina. From the last-named section, as well as from Chester county, South Carolina, and McMinn county, Tennessee, come pieces of graphite more or less rubbed; and one has been sent in from Elmore county, Alabama.

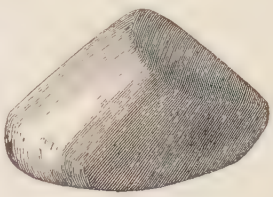


FIG. 129.—Paint stone.

The specimen illustrated in figure 129, from a mound, is a good example of the manner in which the harder hematite was ground.

CEREMONIAL STONES.

FUNCTIONS AND PURPOSES.

The so-called "ceremonial stones" are variously subdivided and named by different writers. They are supposed to have been devoted to religious, superstitious, medical, emblematic, or ceremonial purposes; to be badges of authority, insignia of rank, tokens of valorous deeds, or perhaps some sort of heraldic device; in short, the uses to which they might, in their different forms, be assigned, are limited only by the imagination.

According to Nilsson the ancient Scandinavians wore "victory stones" suspended around their necks,[1] and the Eskimo wear charms and amulets to bring success in fishing and hunting.[2] Adair (1775) says that the American Archi-magus wore a breastplate made of a white conch-shell, with two holes bored in the middle of it, through which he put the ends of an otter-skin strap and fastened a buck-horn button to the outside of each.[3] An explanation of the purpose of many of the smaller perforated stones also may be found in Nilsson's remark[4] that the small ovoid or ellipsoid ones were used as buttons; a string being tied to the robe at one end, run through the hole and tied in a knot.

[1] Stone Age, p. 215.
[2] Abbott: Primitive Industry, p. 408.
[3] American Indians, p. 48.
[4] Stone Age, p. 83.

The various Indians of Guiana in their leisure hours often fashion highly ornamental weapons and implements which they never use except ceremonially, but keep proudly at home for show.[1]

So, too, the Yurok and Hupa Indians of California, as well as some of the tribes of Oregon, have very large spearheads or knives, which are not designed for use, but only to be produced on the occasion of a great dance. The larger weapons are wrapped in skin to protect the hand; the smaller ones are glued to a handle. Some are said to be 15 inches long.[2] The Oregon Indians believed the possession of a large obsidian knife brought long life and prosperity to the tribe owning it.[3]

Some of the wild tribes of the interior have something which they regard as the Jews did the Ark of the Covenant. Sometimes it is known; again it is kept secret. The Cheyenne had a bundle of arrows; the Ute a little stone image, and the Osage a similar stone.[4] The Kiowa had a carved wooden image, representing a human face; the Ute captured it, and the Kiowa offered very great rewards for its return; but the Ute, believing the Kiowa powerless to harm them so long as it was retained, refused to give it up.[5]

The North Carolina Indians, when they went to war, carried with them their idol, of which they told incredible stories and asked counsel;[6] and as a token of rank or authority, the Virginia Indians suspended on their breasts, by a string of beads about their neck, a square plate of copper.[7] These were worn as badges of authority. The native tribes, from our first acquaintance with them, evinced a fondness for insignia of this kind.[8]

Simply for convenience the ceremonial stones in the Bureau collection will here be divided into two general classes. The first, comprising those pierced through the shortest diameter, will be called gorgets, which name, like that of celt, has no particular meaning, but is in common use. The second class will comprise all others, which will have some name that may or may not be suitable to their form, but by which they are usually called. In this class are included boat-shape stones, banner stones, picks, spool-shape ornaments, and bird-shape stones, as well as engraved tablets or stones.[9]

Gorgets.

The relics commonly called gorgets have been found in Europe; they may be convex on one side, concave on the other, and are supposed to

[1] Im Thurn in Jour. Anth. Inst. Gt. Br. and Ird., vol. XI, p. 445.
[2] Powers; Contributions to N. A. Eth., vol. III, pp. 52 and 79.
[3] Chase; MS. Rept. on Shell Mounds of Oregon.
[4] Dodge; Our Wild Indians, p. 131.
[5] Abbott; Primitive Industry, p. 373.
[6] Brickell, John; Nat. History of N. C., p. 317.
[7] Wyth, Graphic Sketches, part I, plate 8.
[8] Schoolcraft in Trans. Am. Eth. Soc., vol. I, p. 401, pl. I.
[9] I am informed by Prof. Cyrus Thomas that he noticed in the collection of Mr. Neff, Gambier, Ohio, a "boat-shape stone" attached to the underside of a stone pipe, which the owner informed him was thus attached when found.

be for bracers.[1] It is said that the Miami Indians wore similar plates of stone to protect their wrists from the bowstring.[2] Herndon and Gibbon remark that a gold ornament in shape like a gorget, but not pierced, is worn on the forehead by some of the Amazon Indians.[3] According to Schoolcraft the so-called gorgets were sometimes used as twine-twisters;[4] but Abbott holds that while some may have been twine-twisters, or may have been used for condensing sinews or evening bowstrings (that is, reducing the strings to a uniform diameter), most were simply ornaments, as they are generally found on the breast of a buried body.[5] Stevens is even more conservative, holding that they were neither twine-twisters nor devices for condensing sinews or evening bowstrings, as they show no marks of wear in the holes.[6]

Some writers suppose the gorgets to have been shuttles; but this supposition can hardly be entertained, although it is true, according to Chase, that the Oregon Indians passed thread with a curved bone needle.[7] As twine-twisters they would be about as awkward as anything that could be devised. As to evening bowstrings, it would seem that if a string were too large in places to pass through a hole it could not be pulled through; pounding and rolling the wet string with a smooth stone, or some such means, would be the remedy. The bracer theory is plausible; but no one seems ever to have seen a gorget used for this purpose.

Few of the gorgets in the Bureau collection show such marks of wear around the edges of the hole as would be made by a cord; but the majority are thus worn at the middle, where the hole is smallest. Some specimens among every lot are not perforated, or only partially so; the drilling seems to have been the last stage of the work. The hole is almost always drilled from both sides, and the few in which it goes entirely through from one side would probably have had it enlarged later from the other. A number are fragments of larger gorgets, the pieces having been redrilled.

Some of the specimens have various notches and incised lines, the latter being sometimes in tolerably regular order; but there is not the slightest indication that these marks had any meaning or were intended for any other purpose than to add to the ornamental appearance of the stone.

If they were to be worn at the belt or on any part of the dress they could easily have been fastened by a knotted string, or if the wearer desired he could have an ornamental button of some kind. If suspended around the neck, in order to make them lie flat against the breast they probably had a short cord passed through the perforation and tied

[1] Evans; Stone Implements, p. 383.
[2] Amer. Antiquarian, vol. II, p. 100.
[3] Expl. in the Valley of the Amazon, vol. II, p. 74.
[4] Indian Tribes, vol. I, p. 90.
[5] Amer. Naturalist, vol. VII, p. 180.
[6] Flint Chips, p. 478.
[7] MS. Rept. on Shell Mounds of Oregon.

above the top of the object, the suspending cord being passed through the loop thus formed.

FIG. 130.—Gorget.

The principal division is into group *A* with one hole and group *B* with two holes, though in many cases this forms the only difference between two specimens.

A. General outline rectangular, or perhaps slightly elliptical, sometimes with one end somewhat narrower than the other, or with one end rounded off, or with the corners slightly rounded. Perforation commonly near one end. The form is represented by the specimen with two perforations illustrated in figure 133, which otherwise fully answers the description. The argillite specimens have the broader ends striated as though used for rubbing or scraping, but in other respects conform to those of other materials. The materials are generally the softer rocks, as shown in the accompanying table:

District.	Steatite.	Slate.	Sandstone.	Schist.	Argillite.
Eastern Tennessee	2	3	2		3
Wilkes county, North Carolina				1	
Knox county, Ohio		1			
Kanawha valley, West Virginia		7	2		

A related type is rectangular or with incurved sides (forming either a regular or broken curve) and rounded ends, and differs in having the perforation near the center. The same pattern sometimes has two holes. It is illustrated in figure 130 (striped slate, from a mound in Kanawha valley, West Virginia). There are also from the same place one each of slate, cannel coal, and clay slate, and from eastern Tennessee one each of slate, shale, and clay slate.

There are a number of small pebbles, thin and flat, with a hole drilled near the edge, from southeastern Tennessee, North Carolina, and southeastern Arkansas. One of these, from Caldwell county, North Carolina, is of banded slate; the others are of clay slate or sandstone. Two of them have straight and zigzag lines on both faces, and notches around the edge.

FIG. 131.—Gorget (?).

Allied to these are a number of pieces of flat stone from southeastern Tennessee, Kanawha valley, and North Carolina, with the faces partially rubbed down smooth, the edges being untouched. They are of slate, talc, or argillite.

From southeastern Tennessee and North Carolina there are several pieces of steatite, which may have been for sinkers. Some have a hole

near one end, others a hole at each end, while still others are not perforated. All have been worked over the entire surface, and some of them are well polished. One of these is represented in figure 131.

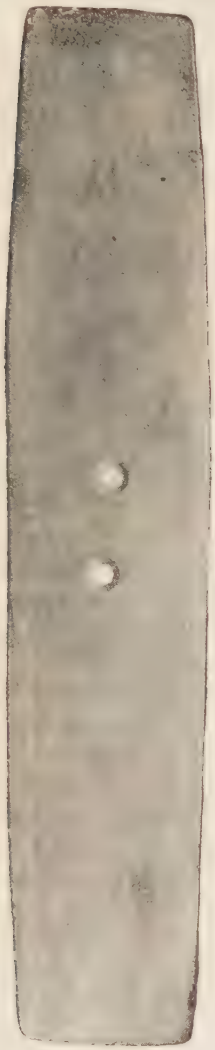


FIG. 133. Gorget

B. Gorgets with two holes. Of these there are several subdivisions, differing more or less widely in form. They are as follows:

1. Thick, with both the sides and the ends incurved or reel-shape; faces flat or slightly convex. This form is represented by the specimen shown in figure 132, from a mound, Knox county, Ohio. There is another from the same place, a third from Kanawha valley, and a fourth from Butler county, Ohio; all of green slate.

FIG. 132.—Gorget, reel-shape.

2. Rectangular, or with sides or ends, or both, slightly curved, either convex or concave; faces flat. Shown in figure 133 (green slate, from a grave in Kanawha valley, West Virginia).

District.	Slate.	Limestone.	Sandstone.	Shale.	Argillite.	Fine quartzite.
Nicholas county, Kentucky, with ends V-shaped		1				
Kanawha valley, West Virginia	11	3	3			
Eastern Tennessee	6	1	1	1		
Ogle county, Illinois	1					
Forsyth county, Georgia						1
Haywood county, N. C					1	
Davidson county, N. C						1
Chautauqua county, N. Y	1					

3. Widest at middle, with single or double curve from end to end; very thin; both sides flat.

District.	Slate.	Sandstone	Schist
Kanawha valley, West Virginia	1	4	
Davidson county, North Carolina	1		
Savannah, Georgia			1
Eastern Tennessee	5		1

4. Same outline but thicker; one face flat, the other convex. Represented by figure 134 (shale, from Jackson county, Illinois). The distribution of the form is as follows:

District.	Sandstone	Slate.	Schist.	Steatite.	Talc.	Argillite.	Shale.
Eastern Tennessee		2		3	1	1	
Haywood county, North Carolina			1	2			
Davidson county, North Carolina		1					
Savannah, Georgia			2	2			
Kanawha valley, West Virginia	1						
Jackson county, Illinois							1
Desha county, Arkansas	1			1			

5. Same outline, but quite thick, approaching the "boat-shape" stones in form. In some the flat side is slightly hollowed out. A majority of them are not perforated. The type (figure 135) is of sandstone, from a mound at Adelphi, Ohio.

FIG. 134.—Gorget.

There are also, from Butler county, Ohio, Kanawha valley, West Virginia, and Savannah, Georgia, one each of slate; from Ross county, Ohio, two, and from Kanawha valley, and Cocke county, Tennessee, one each, all of sandstone. There are two (of sandstone and slate) from Kanawha valley, which differ from the others in having the sides parallel, giving them a semicylindrical form.

The pattern of the specimen illustrated in figure 136 (striped slate, from Butler county, Ohio, of which a number have been found in that state), may be classed between the gorgets and the boat-shape stones. The shorter end of the object has, sometimes, a projection or enlargement at the top, apparently for suspension, although no perforated examples have been found.

BANNER STONES.

Under the head of "banner stones" are placed ornaments having the ends at right angles to the perforation. The hole is drilled in a midrib, from which the faces slope by either straight or curved lines to the edges. The two halves of the stone are symmetrical. In most specimens one face is flatter than the other, even plane in some cases. Some specimens are finished to a high

polish before the hole is started; others have the hole completed with the exterior more or less unfinished. The specimens in the Bureau collection may be classified as follows:

A. Rectangular or trapezoidal, with sides and ends sometimes slighly curved inward or outward.

B. Reel-shape.

C. Crescentic.

D. Butterfly pattern.

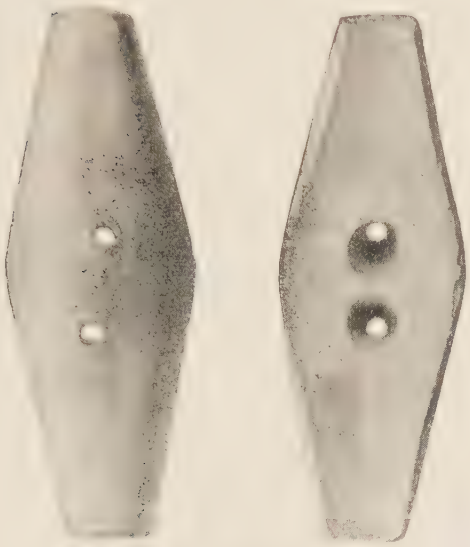


FIG. 135.—Gorget, boat-shape.

FIG. 136.—Gorget resembling boat-shape stone

The last three varieties may be considered as only modifications of the simple rectangular banner stones. By rounding off the corners of the articles or dressing them to sharp points, by cutting away portions from the sides or by trimming away the central portions at either or both ends of the perforations, all these different forms may be produced.

FIG. 137.—Banner stone.

FIG. 138.—Banner stone.

A. A typical specimen is illustrated in figure 137. It is of slate, and was taken from a mound in Kanawha valley, West Virginia. Another good example, shown in figure 138, is of sandy slate, from a grave in Monroe county, Tennessee. The geographic range of this type is wide, though the objects are not abundant.

District.	Granite.	Steatite.	Slate.	Sandstone.	Compact quartzite.	Diorite.
Montgomery county, North Carolina	1	1				
Kanawha valley, West Virginia			2			
Hancock county, Illinois	1					
Savannah, Georgia	1	3		1	1	
Eastern Tennessee			2	1	1	1

B. The reel-shape banner stones are somewhat variable, but are fairly illustrated in figure 139, representing a specimen of argillite from Sevier county, Tennessee.

A related form has the middle cut out from one end, leaving two horn-like projections extending parallel with the hole. An example of this form, shown in figure 140, is of banded slate, from a mound in Kanawha valley, West Virginia.

FIG. 139.—Banner stone, reel-shape.

FIG. 140.—Banner stone, with horn-like projections.

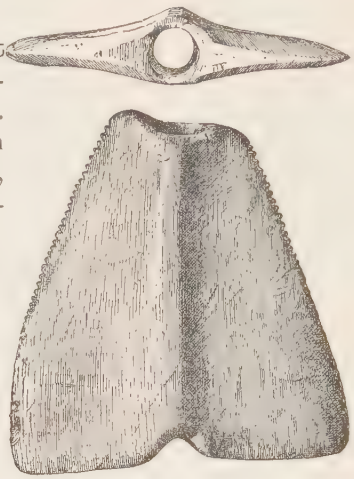


FIG. 141.—Banner stone, crescent-shape.

C. The crescentic banner stones might better be termed "semilunar," since most of them are flat at one end and curved at the other. Occasionally one has both ends curved and parallel, the sides also slightly curved, making the article reniform. Others have the ends straight and parallel, with the sides curved or like the zone of a circle. Two have a midrib for the hole, with the sides dressed down quite thin, as with the butterfly gorgets. All were finished in form before the drilling was done, though some had not received their final polish. The type is illustrated in figures 141 (steatite, from northwestern North Carolina), 142 (pagodite, from Rhea county, Tennessee), and 143 (sand-

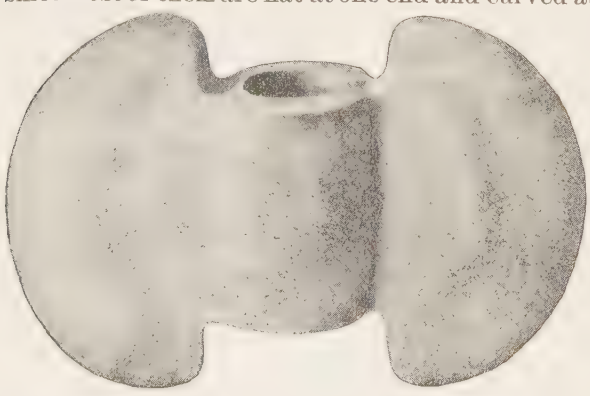


FIG. 142.—Banner stone, crescent-shape.

stone, from Jefferson county, Tennessee). The last form is sometimes called a perforated ax, but the material and fragile make exclude it from every class except the ceremonial stones.

District.	Steatite.	Slate.	Granite.	Reddle.	Pagodite.	Talc.
Savannah, Georgia	1		1	1		
Western North Carolina	2				1	
Montgomery county, North Carolina	1					
Kanawha valley, West Virginia						2
Eastern Tennessee		1			2	

D. The "butterfly" gorgets are so named from their resemblance to a butterfly with expanded wings. The sides or wings are usually quite thin, either semicircular or like a spherical triangle in outline. The perforated midrib is shorter than the wings and carefully worked. A good example, shown in figure 144, is of ferruginous quartz from Monongahela, Pennsylvania, and that illustrated in figure 145 is of banded slate from Kanawha valley. There is also one of the latter material from Lewis county, Kentucky.

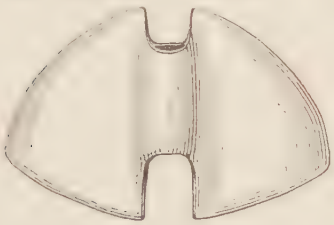


FIG. 143.—Banner stone, crescent-shape.

FIG. 144.—Butterfly banner stone.

FIG. 145.—Butterfly banner stone.

FIG. 146.—Banner stone.

An aberrant form is elliptical in section at the middle, round or nearly so at the ends, the sides expanding rapidly from end to middle by

double curves. It is represented by figure 146 (ferruginous quartz, from Kanawha valley, West Virginia), and by a specimen of quartzite from Union county, Mississippi.

Boat-shape Stones.

There are two types of relics, perhaps ceremonial, for which no use has been determined, and which are named from their general resemblance to the form of a boat. They are as follows:[1]

A. With flat face more or less hollowed, sides triangular and parallel. A number are not perforated. The type is shown in figure 147 (striped slate, from Davidson county, North Carolina).

District.	Compact quartzite.	Slate.	Sandstone.	Porphyry.	Barite.	Steatite.
Davidson county, North Carolina		1				
Southeastern Arkansas	1		2	1		
Savannah, Georgia						1
Eastern Tennessee			1		1	1

B. Coming to a point at each end; flat side, deeply hollowed; perforations near the ends, with a groove between them in which the suspending cord rested. Some have a flattened projection in which the groove

Fig. 147.—Boat-shape stone.

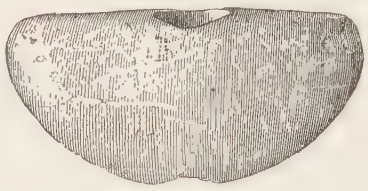


Fig. 148.—Boat-shape stone.

is made. The type (figure 148) is of steatite, from a grave in Sullivan county, Tennessee. The distribution is as follows:

[1] Some perforated stones that will not come under any of these heads are here noted separately under the National Museum numbers:

131614. An elliptical piece of steatite, with notches at each end for suspension, "tallies" all around the edge, and four holes on the longer axis.—Bradley county, Tennessee.

62879. A steatite ornament, shape like a bird's head.—Jefferson county, Tennessee.

131856. A short, wedge-shape ornament of barite, drilled at the larger end.—Loudon county, Tennessee; also a similar but much larger ornament of indurated red clay, possibly catlinite, from a mound in the same county, represented in figure 149. The edges of the holes are much worn by a cord.

90847. A small ellipsoidal steatite bead, with several deep incisions around the edge.—Kanawha valley, West Virginia.

116335. A small marble bead; form like the rim of a bottle mouth.—Bradley county, Tennessee.

113943. Three small pendants of cannel coal. One is in shape like the keystone of an arch, with hole at smaller end; the other two are apparently in imitation of a bear's tusk.—Kanawha valley, West Virginia.

91761. A limestone celt, 6½ inches long, either much weathered since made or else never highly polished, with a large hole drilled in from both sides at the center.—Bartow county, Georgia.

116067. A sandstone celt, with a hole drilled near one corner at the top.—Loudon county, Tennessee.

97764. A large polished piece of steatite, curved from end to end, or claw-shaped. One end is pointed; the other blunt and rounded, with a hole drilled through it.—Caldwell county, North Carolina.

District.	Steatite.	Slate.
Central North Carolina	3	
Eastern Tennessee	2	1
Savannah, Georgia		1

PICKS.

The relics known as picks from their form and not at all from their function vary considerably in size. Not all are perforated. A good example, shown in figure 150, is of striped slate, from Knox county, Ohio. There are also in the collection, from Union county, Mississippi, one specimen of greenstone; from Jackson county, North Carolina, one of slate, and from Montgomery county, North Carolina, one each of steatite and slate. The last named is the half of a larger one that was broken at the part drilled, and has had a hole drilled near the larger end of this fragment, which has not been reworked.

FIG. 150.—Pick.

FIG. 149.—Pendant.

SPOOL-SHAPE ORNAMENTS.

Relics of spool shape, probably ornamental rather than industrially useful, are not uncommon in copper, though very rare in stone. The specimen shown in figure 151 is of sandstone, from Jackson county, Arkansas. There are also, from Prairie and Lonoke counties, one each of sandstone, and from Jackson county two of the same material; from Clark county there is one of pinkish slate, with the stem drilled between and parallel to the faces, the others with stems drilled lengthwise.

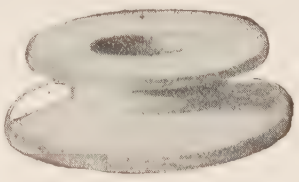


FIG. 151.—Spool-shape ornament.

BIRD-SHAPE STONES.

Stone relics of bird form are quite common north of the Ohio river, but are exceedingly rare south of that stream. A good example, shown

in figure 152, is of granite, from Vernon county, Wisconsin, and the collection embraces another specimen, of sandstone, from Kanawha valley, West Virginia.

According to Gillman, bird-shape stones were worn on the head by the Indian women, but only after marriage.[1] Abbott[2] quotes Col. Charles Whittlesey to the effect that they were worn by Indian women to denote pregnancy, and from William Penn that when squaws were ready to marry they wore something on their heads to indicate the fact.

FIG. 152. Bird-shape stone.

Jones[3] quotes from De Bry that the conjurers among the Virginia Indians wore a small, black bird above one of their ears as a badge of their office.

SHAFT RUBBERS.

The shaft of an arrow is straightened by wetting and immersing it in hot sand and ashes, and bringing into shape by the hand and eye. To reduce the short crooks and knobs it is drawn between two rough grit stones, each of which has a slight groove in it; coarse sand is also used to increase the friction.[4]

Again, a rock has a groove cut into it as wide as the shaft and two or three times as deep. Into this the crooked part of the shaft is forced, and by heating or steaming becomes flexible and can be easily made straight, which shape it will retain when dry.[5]

A somewhat different device for the same purpose appears in the Bureau collection. It is illustrated in figure 153 (of fine sandstone); there was another part to correspond with that shown. The specimen is from Monongahela, Pennsylvania.

TUBES.

As the use of stone tubes by the Indians has given rise to considerable discussion, the following references to the various ways in which they have been employed may help to settle it.

[1] Gillman, H.; in Smithsonian Report for 1873, p. 371.
[2] Primitive Industry, p. 371.
[3] Antiq. of the Southern Indians, p. 30.
[4] Schoolcraft; Indian Tribes, vol. I, p. 212.
[5] Schumacher, Paul; Hayden Surv., Bull. 3, 1877, p. 548.

Schoolcraft observed that the Dakota Indians used a horn tube in bleeding; one end was set over the cut, and the other vigorously sucked.[1] Powers says that the Klamath Indians use tubes for smoking,[2] while H. H. Bancroft says that the Acaxees of Mexico employ "blowing through a hollow tube" for the cure of disease,[3] and also that the Indians of southern California inhale smoke of certain herbs through a tube to produce intoxication.[4] According to C. C. Jones the Florida and Virginia Indians used reeds in treating diseases by sucking or blowing through them, and also used them in cauterizing; and he observes that the Indians of Lower California employed similar processes, using stone tubes[5] instead of reeds. Hoffman illustrates the removal of disease through the agency of a tube of bone by a Jĕs'sakīd' or medicine-man of the Ojibwa.[6] Read calls attention to the fact that the old Spanish writers describe a forked wooden tube, the prongs being inserted in the nostrils, while the other end was held over smoldering herbs, and suggests that the Indians may have used stone tubes in the same way.[7]

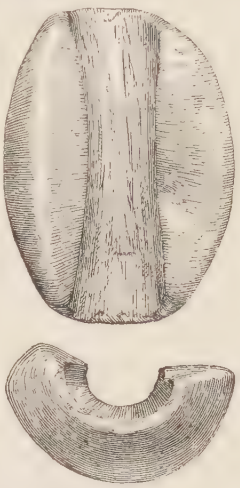


FIG. 153.—Shaft rubber.

The Indian mode of inhaling smoke would produce the same result, whether drawn through the mouth or into the nostrils.

The use of stone tubes for astronomical purposes, which has been discovered by some imaginative writers, is, of course, absurd; nevertheless they are useful in viewing distant objects on a bright day, especially when looking toward the sun.

Nearly all of the tubes made of soft material with tapering perforation seem to have been gouged rather than drilled. Schumacher observes that the California Indians drilled their tubes from both ends and enlarged the hole from one end by scraping, the mouthpiece being made of a bird bone stuck on with asphaltum.[8]

There are five classes of stone tubes in the collection of the Bureau, as follows:

A. One end flattened and expanding into a wing on either side. This class is illustrated by figure 154 (from Kanawha valley, West Virginia). The corners of this specimen have been trimmed off; the typical form is indicated by the dotted lines. There are also from the

[1] Indian Tribes, vol. I, p. 253.

[2] Contributions to N. A. Eth., vol. III, p. 426.

[3] Native Races, vol. I, p. 589.

[4] Ibid., p. 566.

[5] Antiquities of the Southern Indians, pp. 362–364.

[6] Hoffman, W. J.; "The Mide'wiwin of the Ojibwa." Seventh Annual Rep. Bur. Eth., 1885–86, p. 278, pl. XVIII.

[7] Amer. Antiquarian, vol. II, p. 154.

[8] Peabody Mus., 11th Ann. Rept., p. 268.

same locality one of quartzite, and from Ross county, Ohio, one of sandstone.

B. Conical; the bore more tapering than the exterior. Represented by the specimen shown in figure 155, of sandstone, from a mound in Kanawha valley, West Virginia.

District.	Sandstone.	Steatite.	Slate.	Clay slate.
Sevier county, Tennessee	1			
Savannah, Georgia		1		
Western North Carolina		1	1	
Kanawha valley, West Virginia	2			1

C. Hour-glass shape, usually but not always with a narrow ring or projection around the smallest part. Exterior with gently curving outlines; the perforation is usually in the form of a double cone, with the points at the smallest part of the tube, which may or may not be midway between the ends. A good specimen, illustrated in figure 156, is of steatite, from Sevier county, Tennessee.

FIG. 154.—Tube, one end flattened.

D. Of nearly uniform diameter inside and out; section circular, elliptical, or flattened on one side. This form is exemplified by figure 157, a specimen from North Carolina. There are also one each from Caldwell, Haywood, and Montgomery counties, North Carolina, all of slate.

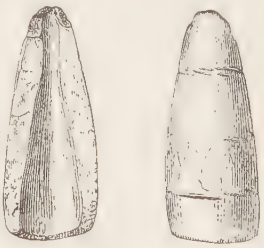


FIG. 155.—Tube, conical.

E. Round or elliptical in section, $\frac{3}{4}$ to $2\frac{1}{2}$ inches long; probably beads. The collection includes specimens from Bradley county, Tennessee, of steatite; from Savannah, Georgia, of ferruginous sandstone; and from Union county, Mississippi, of jasper.

PIPES.

So much has been written concerning pipes that few references seem necessary, and none will be given except from Col. R. I. Dodge, who, after an experience of many years among the Plains Indians, says that the latter have different pipes for different occasions, as the medicine

pipe, peace pipe, council pipe, and a pipe for common use. Each is sacred to its own purpose.[1]

In an article so highly prized by its owner, great pains would be expended to give an ornamental appearance to one which would be used on important ceremonial occasions; and it would be carved or worked in a manner gratifying to its maker or the one for whom it

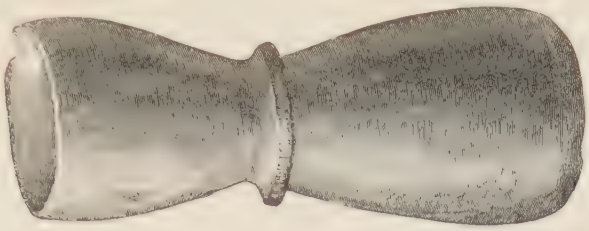


FIG. 156.—Tube, hour-glass form.

was intended. This fact, and the statement quoted above, will explain the great variety in form from a limited area. Still, in some sections of the country there are certain types that prevail, and may be in some cases peculiar to these localities; such, for instance, are the long stemmed pipes from western North Carolina and eastern Tennessee.

In many pipes of soft stone the bowl is gouged out instead of drilled.

FIG. 157.—Tube, cylindrical.

The pipes in the Bureau collection embrace the following classes:

A. Stem with an elliptical or somewhat triangular section; the bowl near one end, leaving a projection in front; stem hole in long end. The form is shown in figure 158. From Caldwell county, North Carolina there are two similar pipes of steatite. Another, from Preston county, West Virginia, differs only in having the stem hole in the short end.

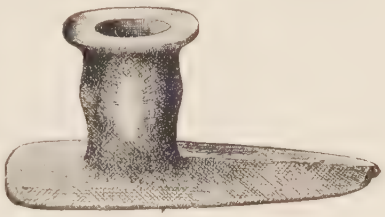


FIG. 158.—Pipe, flat base.

B. Same form of stem; no projection in front, the bottom of the stem curving up gradually into the front of the bowl. This type is represented by figure 159 (of steatite, from a mound in Loudon county, Tennessee). There are also, from Kanawha valley, West Virginia, an example of talcose slate, and from Caldwell county, North Carolina, one of steatite.

C. Stem having a midrib in which the hole is bored. One of steatite, from Caldwell county, North Carolina, has a prow; the others have not. Another of steatite from Loudon county, Tennessee, has a slender projection below the bowl, as if for a handle. The axis of the

[1] Dodge; Our Wild Indians, p. 130.

bowl and that of the stem meet at any angle between 100° and 170°. Figure 160 represents a typical specimen, of steatite, from a mound in

FIG. 159.—Pipe.

Sullivan county, Tennessee. There are also, from Caldwell county, North Carolina, and Kanawha and Preston counties, West Virginia, one each, and from Sullivan county, Tennessee, two, all of steatite; and there is an example from Kanawha valley, West Virginia, of material not identified.

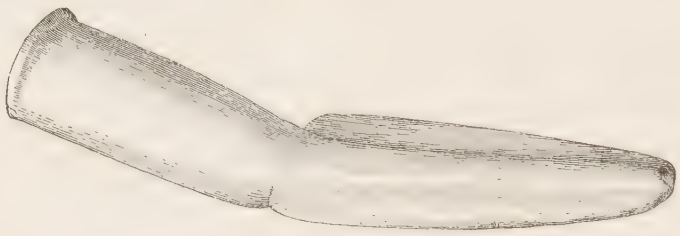


FIG. 160.—Pipe.

D. With bowls and stems either round or square; very large. A good example (figure 161) is of red sandstone, from southeastern Missouri; it is the only pipe in the entire collection of the Bureau on which is shown any attempt at ornamentation. From Jefferson county, Tennessee, and Savannah, Georgia, there are one each, of steatite.

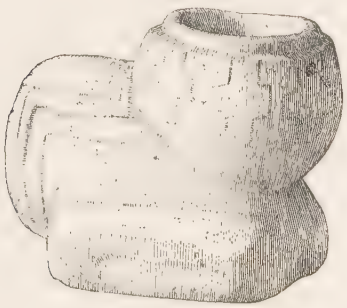


FIG. 161 —Pipe, ornamented.

FIG. 162.—Pipe.

E. Cylindrical bowl, with a square-edged groove around it near the middle, below which the bottom has a somewhat celt like form, with stem hole in one side. A small hole is drilled near the edge at the

bottom, probably for the purpose of suspending feathers or other ornaments. The type is represented by figure 162 (of limestone, from Crawford county, Wisconsin). Pipes of the same form are found also in central Ohio.

F. Round stem from one-half inch to 10 inches long; bowl at extreme end, set on at various angles from nearly a right angle to almost a straight line. Good examples are illustrated in figure 163 (steatite,

FIG. 163.—Pipe, long-stemmed.

from Caldwell county, North Carolina) and 164 (also of steatite, from a mound in Monroe county, Tennessee). The other specimens in the collection are distributed as shown in the table:

District.	Sandstone.	Steatite.
Eastern Tennessee	4	7
Caldwell county, North Carolina		22
Chester county, South Carolina		1

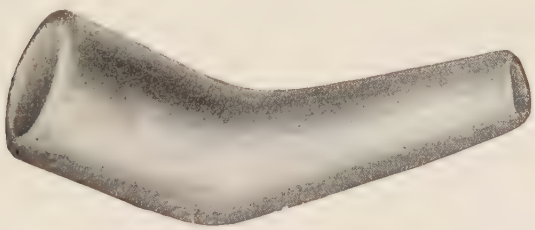


FIG. 164.—Pipe, short-stemmed.

G. Same form of stem, short, with flange around the top of the bowl. Represented by one of sandstone, from a mound in Monroe county, Tennessee (figure 165), and three of sandstone and two of marble from eastern Tennessee.

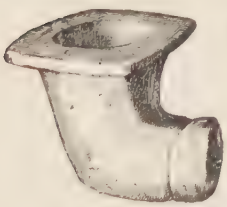


FIG. 165.—Pipe.

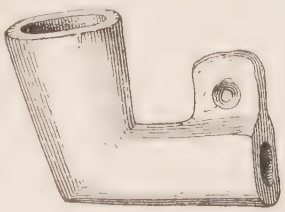


FIG. 166.—Pipe.

H. Small, stem more or less squared, bowl upright. There are two examples of this class from Monroe county, Tennessee, each having a flat projection or ridge on top of the stem, which is perforated for attachment of ornaments. The type, represented in figure

166, is of clay slate, from Monroe county, Tennessee. It will appear from the following table that the distribution of this form is limited:

District.	I	K	L	M
Savannah, Georgia	1			
Eastern Tennessee	1	1	2	
Western North Carolina			3	

I. Egg-shape bowl, stem hole in the side. One from Bradley county, Tennessee, of argillaceous limestone, has a hole drilled from end to end, but no stem hole. It may have been made so intentionally, or the drilling may have been carried too far and the specimen left unfinished. The type is of barite, from Sevier county, Tennessee (shown in figure 167). Another specimen, from McMinn county, Tennessee, is of argillaceous limestone.

FIG. 167.—Pipe.

J. Form like last, with a flange around the top of the bowl. A typical specimen, shown in figure 168, is of steatite, from Loudon county, Tennessee. There are, also, from Preston county, West Virginia, one of sandstone, and from Caldwell county, North Carolina, two of steatite.

FIG. 168.—Pipe.

K. Bowls egg-shape, but quite long and sometimes rather pointed at the bottom; stem hole in the side. This class includes the following: From Savannah, Georgia; Roane county, Tennessee; and Adams county, Ohio, one each of sandstone; from Holt county, Missouri, one of micaceous sandstone; from Kanawha valley, West Virginia, one of indurated red clay, possibly catlinite; and from Caldwell county, North Carolina, three of steatite.

CHIPPED STONE ARTICLES.

MATERIALS AND MANUFACTURE

The chipped implements in the Bureau collection are nearly always made of some form of flint or similar chalcedonic rock, as it is easily chipped and can be brought to a keen edge or point. Sometimes quartz, quartzite, argillite, or even a more granular rock is used; but this is infrequent, and is due to the scarcity of the more desirable material.

In the spades and hoes first to be considered the flaking seems to have been by percussion mainly, if not entirely; the same method appears to have been employed in obtaining flakes from blocks, to work into the smaller implements. Some of the processes used in making them will be hereinafter described.

Spades.

It must be admitted that most Indians depended largely on agriculture for subsistence; some historical works that represent them as barbarous hunters, depending entirely on the chase, will, on the same page perhaps, relate how Virginia and New England pioneers were saved from starvation by supplies of corn, beans, and pumpkins obtained from the Indians. This being the case, some method of cultivation was necessary.

It is not to be inferred that "cultivation" implies all that is now meant by the term; the Indian seems merely to have worked the hill in which his corn was planted and not the whole surface of the field, a shallow hole being scooped out in which the grain was dropped, and as the stalk became larger the dirt was heaped up around it. The remains of many "Indian old fields" in various parts of the country show this, there being no long ridges as in cornfields of the present day, but only a great number of these detached hills. The great scarcity of implements suitable for such work argues nothing, for in most parts of the country stone easily worked and adapted to the purpose is unobtainable.

There are a few flint deposits found in southern Illinois in which the material occurs in nodules that can be made with even less work than a piece of wood into suitable implements; and in the country which may be considered as belonging to this archeologic district the flint hoes and spades are tolerably abundant. In other portions of the country, wood, the shoulder blades of large animals, and mussel-shells perforated for attachment to a handle, were formerly used; the shells are frequently found, but the other materials have long since disappeared.

Early observations on the industries of the aborigines are significant. Thus, according to De Forest, the Connecticut Indians used spades rudely constructed of wood, or of a large shell fastened to a wooden handle;[1] and Palmer[2] figures a hoe made of horn, 14 by 5 by one-fourth inches, in a wooden handle 5 feet long, which is split and slipped over the smaller end; such, with others of wood and stone, were used among the Utah Indians before iron was introduced. Dawson holds that they were probably prepared in large numbers for the planting time, when the whole tribe mustered to till the fields, and that when the work was over they were gathered and hidden in some safe place until the next

[1] De Forest, J. W.; History of Indians of Conn., p. 5.
[2] Peabody Mus., 11th Ann. Rept., p. 271.

season.[1] This may have been the case to some extent, but the specimens found in these hiding places seldom have marks of use, and it is more probable that they were the property either of persons living at a distance or of an individual manufacturer in some particular village, being thus concealed for safe-keeping until there was a demand for them or, perhaps, to await a convenient time for transportation. A sedentary tribe would have no more reason for hiding this than any other kind of property.

The chipped implements known as spades are frequently found buried in large numbers. Two caches were disclosed by high water in

FIG. 169.—Chipped spade with pointed ends.

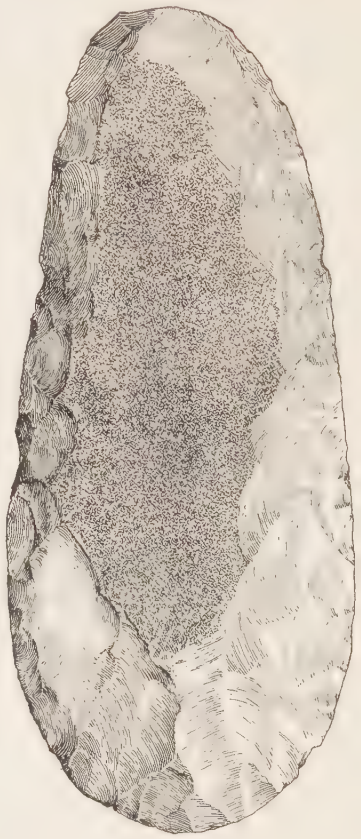


FIG. 170.—Chipped spade with rounded ends.

1884, near Caseyville, Kentucky, containing, respectively, 57 and 75 specimens from 6 to 13 inches long.

The most common form is that having an oval or elliptical outline, with the ends either coming to a point or rounded. Long use of those having pointed ends would wear them off until they approached the others in form; but so many of both patterns show no evidence of use

[1] Fossil Men, p. 125.

that this distinction must be considered intentional. The principal varieties are as follows:

A. Those with pointed ends. Figure 169 represents a typical specimen of yellow flint, from Union county, Illinois.

District.	Yellow flint.	Gray flint.
Southwestern Illinois	2	2
Southeastern Arkansas	2	
Cheatham county, Tennessee		1
Union county, Mississippi	1	

B. Those with the ends rounded. Represented by figure 170 (yellow flint, from Union county, Illinois).

District.	Yellow flint.	Gray flint.	Brown flint.	Argillite.
Southwestern Illinois	2	2		
Cheatham county, Tennessee			1	
Lauderdale county, Tennessee	1			
Polk county, Tennessee				
Lauderdale county, Alabama				4
Craighead county, Arkansas	1			

A specimen from Jackson county, Illinois, has had a portion of the edge broken squarely. The polish over this fractured surface shows that it was long used after breaking without being rechipped to a sharp edge. This indicates usage only in loose ground, as it evidently would be quite difficult to force the square, broken part into a hard soil or tough sod.

The specimens from Polk county, Tennessee, are pecked or chipped, or both, and are quite roughly made. They are neither scratched nor polished, and may be unfinished implements of some other class, though agreeing closely with the flint spades in shape and size.

C. A modification of the last form has the upper portion chipped away along the sides until it is ovoid, with a blunt point, leaving the lower part a regular curve. An example, shown in figure 171, is of grayish brown flint, from Scott county, Missouri. There are also one each from Mississippi county, Missouri, and Hopkins county, Kentucky, of the same material.

D. Like the above, but much shorter in ratio to the width, and with a flatter curve. The type, figure 172, is of yellow flint, from a mound in Obion county, Tennessee. There are also three from Union county, Illinois, one of them with almost the same dimensions.

E. Semicircular outline, with sides notched for securing the handle, as in arrowpoints and spearheads. Represented by figure 173, showing a specimen of gray flint from a mound in Mississippi county, Arkansas. There are four additional specimens, all from Union county, Illinois.

F. A related form, also notched for attachment of handle. Figure 174 represents an example of yellow flint, from Poinsett county, Arkansas, the only one of this shape in the collection.

From Jackson county, Illinois, there is a series beginning with a small scraper and a small scraper-like celt, and passing gradually into the large spades or digging-tools, there being a number of intermediate forms and sizes. Two specimens, only 6 inches long, have the glazed surface so characteristic of these implements, which could have been produced only by long-continued use in digging.

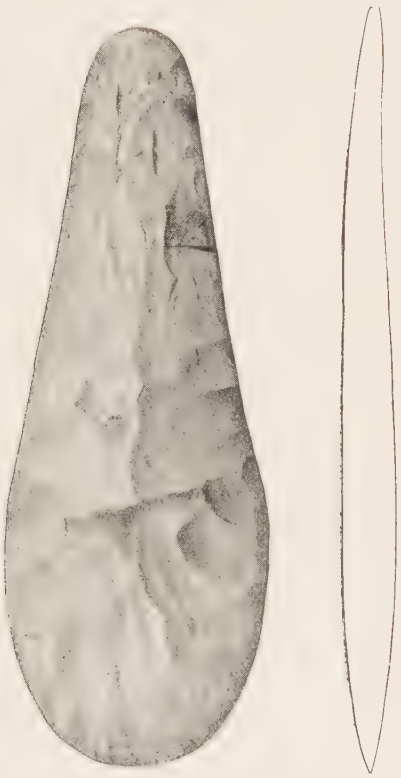


FIG. 171.—Chipped spade, ovoid.

From a workshop at Mill creek, Union county, Illinois, there are a large number of pieces in every stage of work. Among them can be made series of all the different types here given, from the nodule in its natural state to the completed implement. Near by is a flint deposit showing extensive aboriginal quarrying.

Dawson,[1] in speaking of these implements, says: "The rudest of all rude implements, similar to the paleoliths of Europe, were used by the more settled and civilized agricultural nations." While the majority of them are rude, simply because there was no necessity for elaborate work or fine finish in tools of this class, yet there are many specimens (as, for example, the one shown in figure 171) which in symmetry and workmanship will compare favorably with the larger specimens of other types, due regard being had to the fact that the coarse flint of which they are usually made does not admit of the most delicate execution.

TURTLEBACKS.

The singular name "turtleback" is suggested instantly on seeing a specimen of the class so designated by Abbott and others. As commonly used, it refers to rude or unfinished leaf-shape implements of any size, which may be found in great abundance almost anywhere.

[1] Fossil Men., p. 119.

It is used here, however, to denote more especially the disks or almond-shaped pieces of flint or chert sometimes found cached in considerable numbers.

Perkins[1] records the discovery of such caches in Vermont; an exceptional case, as they are seldom found outside of the Mississippi valley. The southern portion of Illinois has furnished more than any other section; those found there are almost invariably made from nodules of bluish gray hornstone, the concentric lines being strongly marked.[2]

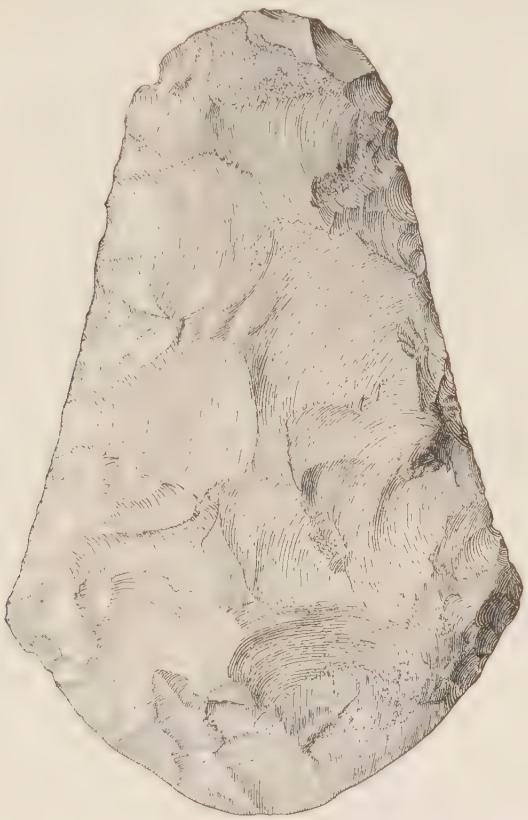


FIG. 172.—Chipped spade.

The Bureau has secured a large number from southern Illinois, ranging from 3½ to 7½ inches in length, some nearly circular, others having a length nearly twice the breadth. All have secondary chipping around the edges. Many of the larger ones and most of the smaller have the edges more or less worn or polished in such manner as would result from use as knives or scrapers. A typical specimen is shown in figure 175.

[1]Proc. A. A. A. S., vol. XXXI, p. 592.

[2]Since this was written several thousand specimens have been found in a small mound near Chillicothe, Ohio. The nearest point at which similar material is known to exist is between Corydon and Leavenworth, Indiana.

Stevens[1] denies in strongest terms that these relics are unfinished implements, saying it is the worst possible form into which flint could

FIG. 173.—Chipped spade, showing handle notches.

FIG. 174.—Chipped spade.

be chipped for carrying or for future work. On the other hand, Cheever[2] says the Indians of California usually carry a pouch of treasures, consisting of unfinished arrowheads or unworked stones, to

FIG. 175.—Chipped disk, or "turtleback."

be slowly wrought out when they are industriously inclined. Catlin, too, observed that the Apache sometimes carry bowlders of hornstone a long distance to obtain material for arrowheads;[3] and according to

[1] Flint Chips, p. 442.

[2] Amer. Naturalist, vol. IV, p. 140.

[3] Last Rambles Among the Indians, p. 187.

im Thurn, the various Indian tribes of Guiana have each their special manufacture and exchange with other tribes.[1] Tylor says:

> Till lately the Patagonians, when they came on their journeys to a place where suitable flint or obsidian was to be found, would load themselves with a supply of lumps to chip into these primitive currier's scrapers.[2]

Both Jewitt[3] and Evans[4] say that stones of this character were used as sling-stones; but there is no evidence that North American Indians ever used slings. Speaking of similar stones, Tylor remarks:

> They were used either as knives or scrapers; with the curved side upward (or out) there would be no danger of cutting a hide in skinning game, and they could be used to cut up the flesh; while by putting the pointed end in the handle they could be used as scrapers.[5]

The smoothed edge in so many specimens substantiates the last statement, while the theory that they are unfinished implements finds support in the fact that nearly all the nodules from which they are made have an ellipsoid form, and the present shape of the implement would result from chipping away the useless weathered surface to lessen the weight.

Smaller chipped Implements.

Materials and Modes of Manufacture.

In the remaining portion of this paper, which will treat of the smaller chipped implements, a plan somewhat different from that of the preceding part will be followed.

As already stated, these specimens are almost invariably made of some form of flint; this term including chalcedony, basanite, jasper, chert, hornstone, and similar rocks. So common is its use that the term "flints" is gradually being adopted as a name for all the different classes of arrowheads, knives, drills, etc. The exceptions are not numerous enough to justify separate classification, so no tables of material will be used. Further, the great abundance of such relics in all portions of the country makes useless any allusion to the number from any particular locality; about the only limitation to their discovery is the amount of time and care which one chooses to give.

Before entering on the description, some quotations may be given in regard to methods of making these chipped implements.

According to Evans, the Mexican Indians take a piece of obsidian in the left hand and press it firmly against the point of a small goat-horn held in the right, and by moving it gently in different directions they chip off small flakes until the arrow is complete;[6] they also

[1] Journal Anth. Inst. Gt. Br. and Ird., vol xi, p. 447.
[2] Anthropology, p. 245.
[3] Jewitt, Llewellyn; Grave-mounds and their Contents, p. 121.
[4] Stone Implements, p. 374.
[5] Op. cit., p. 245.
[6] Stone Implements, p. 36 (from Craveri).

cut a notch in the end of a bone, into which the edge of the flake is inserted and a chip broken off by a sideways blow.[1] According to the same author, the Eskimo sometimes set the flake in a piece of split wood. The arrow is roughly chipped by blows with a hammer, either direct or with a punch interposed, and is then finished by pressing off fine chips with a point of antler set in an ivory handle.[2] Not only leaf-shape barbed arrows, but also ones either with or without the stem, can be produced by pressure with a point of antler; the former, however, are the more easily made, and were probably earlier in use.[3]

The Plains Indians lay the flat side of a flake of obsidian on a blanket, or other yielding substance, and with a knife nick off the edges rapidly. In their primitive state they probably used buckskin instead of the blankets, and pointed bone or horn instead of the knife.[4]

The Apache holds the flake or flint in his left hand, places his punch at the point where the chip is to be broken off, and it is struck by an assistant, thus knocking a chip from the under side; the flake is then turned and the process repeated, until the arrow is complete. The stone is held in the hand, as it can not be chipped on a hard substance.[5] A punch observed by Catlin in use by these Indians was a whale tooth 6 or 7 inches long, with one round and two flat sides. The Fuegians, according to the same authority, use a similar process and make as fine implements.[6]

The Eskimo make a spoon-shaped cavity in a log, lay the flake over it, and press along the margin, first on one side and then on the other, like setting a saw, until they form two sharp serrated edges. The working tool is a point of antler firmly bound into a piece of ivory. The same plan is used by widely separated peoples.[7]

Nilsson, in chipping out gun flints with a stone hammer, found it necessary to have the point operated on lie immediately above a point that rested on the rock "anvil" which he used.[8]

The Veeard or Wiyot of California used a pair of buck-horn pincers tied together with a thong at the point; they first hammered out the arrowhead in the rough, and then with these pincers carefully nipped off one tiny fragment after another.[9] The Klamath cover the hand with a piece of buckskin to keep it from being cut, and lay a flake along the ball of the thumb, holding it firmly with the fingers. With a point of antler from 4 to 6 inches long, they press against the edge, thus removing scales from the opposite side; they turn the flake around and over frequently, to preserve symmetry.[10]

[1] Stone Implements, p. 36 (from De Pourtales).
[2] Ibid., p. 35 (from Belcher).
[3] Ibid., p. 38.
[4] Crook in Smithsonian Report for 1871, p. 420.
[5] Catlin: East Rambles, pp. 184, 185.
[6] Ibid., p. 290.
[7] Stevens: Flint Chips, p. 81 (from Belcher).
[8] Ibid., p. 84.
[9] Powers in Contributions to N. A. Eth., vol. III, p. 104.
[10] Ibid., p. 374.

The Shasta Indian lays a stone anvil on his knee, holds the edge of the flake against it, and with his stone hammer chips off flakes, finishing the base first, and gently chipping the whole arrow into shape. Both obsidian and glass are used.[1] The Shoshoni Indians used the same process.[2]

A Pit River Indian has been seen to make a very sharp and piercing arrow from a piece of quartz, with only a piece of round bone, one end of which was hemispherical with a small crease in it (as if made by a thread) one-sixteenth of an inch deep. The arrow was made by pressing off flakes by main strength, the crease being to prevent the bone from slipping, and affording no leverage.[3] John Smith (1607) says of the Powhatan Indian:

> His arrowhead he maketh quickly, with a little bone, of any splint of stone or glass.[4]

The Cloud River Indian used two deer prongs, one much smaller than the other, the points ground to the form of a square, sharp-pointed file. He had also some pieces of iron wire tied to sticks and ground in the same manner; these were better than the deer horn, because harder, and not needing to be sharpened so often. The flake was held firmly in the left hand, guarded by a piece of buckskin; he pressed off chips with the larger tool, turning the arrow end-for-end when done on one side, so as to keep the edge opposite the middle line. The notches for barbs were worked out in a similar manner with the smaller tool.[5]

Some of the California Indians prefer agate and obsidian for their implements, as the close grain admits more careful working. They use a tool with its working edge shaped like a glazier's diamond (apparently a piece of bone or antler with a square-cut notch on the side); the flake is held in the left hand, while the nick in the side of the tool is used to chip small fragments.[6] Peale makes similar statements, and adds that the notches are of different sizes to suit the different stages of work.[7]

The Klamath Indians, according to Schumacher, have a slender stick 1½ feet long, with a piece of sea-lion tooth, or antler, fastened to the end of it. Holding one end under the arm to steady it, they take a flake in the left hand, wrapped in a piece of buckskin so as to leave only the edge exposed, and by pressure with the point of the tool break off flakes as large as necessary, the last being quite fine, to give sharp edges to the arrow. The notches are worked out by means of a point of bone 4 or 5 inches long, without a shaft.[8] Chase gives a similar account, but says that iron points have now taken the place of the bone or horn points formerly used.[9]

[1] Bancroft; Native Races, vol. I, p. 342.
[2] Schoolcraft; Indian Tribes, vol. I, p. 212.
[3] Beckwith in Rep. Pac. R. R. Survey, vol. II, p. 43.
[4] History of Virginia.
[5] Redding in Amer. Naturalist, vol. XIII, p. 665.
[6] Cheever in ibid., vol. IV, p. 139.
[7] Cited by Stevens, Flint Chips, p. 78.
[8] Hayden Survey, Bull. 3, 1877, p. 547.
[9] MS. account of the Shell Mounds of Oregon.

It may not be out of place in this connection to give a few quotations in regard to the length of time required for making an arrowhead.

According to the Marquis de Nadaillac, the Mexicans could turn out a hundred flint knives (probably only unworked obsidian flakes) an hour,[1] while Crook says that the Plains Indians with only a knife for nicking off the edges, will make from fifty to one hundred arrows in the same period.[2] Chase found that a Klamath Indian required five minutes to complete a perfect arrowhead;[3] though Stevens observes that a Shasta Indian spent an hour in chipping one from a flake of obsidian,[4] and Lubbock states that the most skillful Indian workmen can not hope to complete more than a single arrow in a day's hard work.[5] Powers also speaks of the aborigines of California as "using that infinite patience which is characteristic of the Indian, spending days, perhaps weeks, upon a single piece;"[6] and Tylor notes "that utter disregard of time that lets the Indian spend a month in making an arrow."[7]

The last two references are probably to the large and finely worked pieces used for ceremonial or ornamental purposes.

Classification of the Implements.

The only practicable division of the greater part of the smaller flints is into stemmed and stemless, the former having a prolongation at the base for firmer attachment to a shaft or handle, the latter being of a triangular or oval shape. The stemmed implements may be barbed or not, and the stem either narrower or broader toward the end.

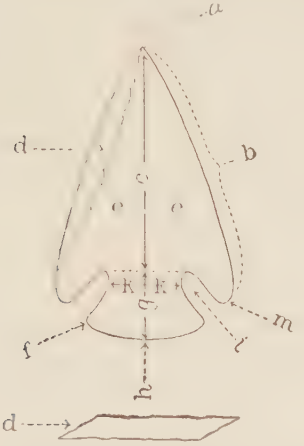
The name "arrowhead" so commonly applied, fits only the minority of specimens, as none but the smaller ones could be so used; the larger are too heavy. The longest stone arrowpoint in the extensive collection of arrows in the National Museum measures two and five-eighths inches in length and is narrow and thin. An arrowpoint two inches in length is seldom seen. The larger specimens were probably knives and spearheads; but it would be difficult to assign any certain use for a particular type, the markings on so many indicate usage for which their shape would seem to render them unsuitable. It is probable that a single specimen served a variety of purposes.

Wood, bone, and shell were also used to a considerable extent, in the manufacture of implements for which flint would seem much better adapted. Thus for fish spears the southern Indians used canes, sharp-pointed, barbed, and hardened in the fire,[8] while knives were formerly made of flint or cane; these are still used when the hunting knife has

[1] Prehistoric America, p. 170.
[2] Smithsonian Report for 1871, p. 420.
[3] MS. Shell Mounds of Oregon.
[4] Flint Chips, p. 77.
[5] Prehistoric Times, p. 106 (from Dodge and Blackmore).
[6] Contributions to N. A. Eth., vol. III, p. 104.
[7] History of Mankind, p. 188.
[8] Adair; American Indians, p. 403.

been lost.[1] The California Indians had arrows tipped with hard-pointed wood for common use, and with agate or obsidian for war.[2]

The accompanying diagram (figure 176) will render plain the different terms used in the following descriptions:



a ....Point.
b ....Edge.
c ....Face.
d ....Bevel.[3]
e ....Blade.
f ....Tang.
g ....Stem.
h ....Base.
i ....Notch.
k ....Neck.
m....Barb, or shoulder.

FIG. 176.—Diagram, explaining terms.

The only difference between barb and shoulder is that the barb is prolonged toward the base. The shoulder is called squared or rounded according to whether the edge of the implement makes an angle or a curve where drawn in to form the stem.

In the stemless specimens the base is the end opposite the point.

A tapering stem means one narrowing toward the base; straight, one whose sides are parallel; and expanding, one which is widest at the base.

STEMLESS FLINTS.

CHARACTERS AND USES.

The stemless flints are triangular or oval in outline. For convenience they will be divided into those small enough for arrowpoints (not above 2½ inches long) and those which are too large for such purpose. The latter reach to the length of 7½ inches. They are chipped to a sharp edge all around. The ratio of width to length varies from 1:4 to 4:5.

These objects were mostly for use as knives, scrapers or spearheads. Some of the thicker ones were spikes for clubs. Abbott[4] mentions three triangular jasper implements 3 to 4 inches long from graves, associated with fragments of large bones which showed plainly that they had been used for clubs, and the Iroquois are known to have used a club with a sharp-pointed deer-horn about four inches long inserted in the lower side. Schoolcraft[5] illustrates a pointed stone with a square

[1] Adair; American Indians, p. 410.
[2] Cheever in Amer. Naturalist, vol. IV, p. 139.
[3] The section below shows this more plainly.
[4] Amer. Naturalist, vol. X, p. 116.
[5] Indian Tribes, vol. II, p. 74, fig. 5.

section (apparently of the class usually called "picks"), mounted in a club which is curved at the end to let the spike set in the end at a right angle to the handle; and Brickell observes that the North Carolina Indians used clubs or long poles, in the ends of which were fastened artificially sharpened stones, or horns of animals.[1] Morgan also notes that among the Iroquois rows of arrow-shaped chert heads about two feet in extent have been found lying side by side. They were set in a frame and fastened with thongs, forming a species of sword.[2] According to Tylor the Mexicans had a similar sword, with obsidian teeth gummed in holes in a war club,[3] and Bourke observed at Taos pueblo a similar weapon with iron teeth.[4] But the number of specimens found mounted indicates that most of them were used as knives or scrapers.

LARGER IMPLEMENTS.

A. With base and edges straight or slightly convex; corners square. The type illustrated in figure 177 is from Montgomery county, North Carolina. Similar forms come also from eastern Tennessee; central and western North Carolina; southwestern Illinois; Miami and Scioto valleys, and central Ohio; southwestern Wisconsin; northeastern and southwestern Arkansas; northeastern and northwestern Alabama, and Coosa valley in the same state; Kanawha valley, West Virginia; northeastern and central Kentucky; and Savannah, Georgia.

FIG. 177.—Triangular chipped flint.

B. Base straight or nearly so; edges parallel most of the length, curving abruptly to a point; usually with one face less convex than the other, even quite flat, giving a plano-convex section; medium size. The specimen shown in figure 178, from Kanawha valley, West Virginia, is representative. Other examples come from eastern Tennessee; central North Carolina; northwestern Alabama; Kanawha valley; and southwestern Illinois.

FIG. 178.—Chipped flint.

C. Base straight or nearly so; corners square or slightly rounded; edges convex, curving gradually and regularly to the point; usually widest about one-third of the way above the base; varying much in width, and in length from 6½ inches down to the arrowpoint. A few of the largest have the edges slightly expanding at their junction with the base, for firmer attachment to a handle. The type is

[1] Nat. Hist. of N. C., p. 318.

[2] League of the Iroquois, p. 359.

[3] Anahuac, p. 332.

[4] Bourke, John G.; Snake Dance of the Moquis, p. 251. See also Dodge; Our Wild Indians, plate 5.

figure 179 (from Loudon county, Tennessee). Other specimens are from eastern Tennessee; central and western North Carolina; Kanawha valley; Keokuk, Iowa; Miami and Scioto valleys, and central Ohio; eastern, southern, and southwestern Wisconsin; northeastern Arkansas; central and northeastern Kentucky; northwestern Georgia, and Savannah; southwestern Illinois; and Coosa valley, Alabama.

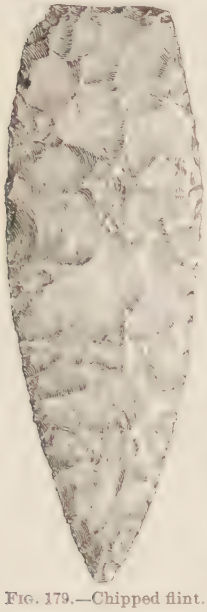


FIG. 179.—Chipped flint.

D. Narrow and thick; up to 6 inches long; convex base; edges straight to the base, where they expand somewhat, giving the implement a bell shape. The largest specimen in the lot (figure 180) has both faces polished almost the entire length, a feature absent from all the others. This example is from Caldwell county, North Carolina. The form is found also in central and western North Carolina, eastern Tennessee, northeastern Kentucky; Kanawha valley; and northeastern Arkansas. Few of the flints occur in the collection except from the two localities first mentioned, where they are moderately abundant.

FIG. 180.—Chipped flint, somewhat bell-shape.

E. Elliptical outline; some very thin, others resembling celts. One from Kanawha valley has the projecting facets and ridges on one face very smooth from use, those on the other being still sharp, as when first chipped. The one figured has the edge worn smooth entirely around, seemingly from use as a cutting tool, the ends being most worn. Represented by figure 181 (from Dane county, Wisconsin). Found also in southern and southwestern Wisconsin; eastern Tennessee; northeastern Arkansas; central and western North Carolina; Brown county, Illinois; Kanawha valley; and South Carolina.

FIG. 181.—Chipped flint, elliptical outline.

FIG. 182.—Chipped flint, leaf-shape or oval outline.

F. With the outline a continuous curve from the point entirely around, the base being regularly rounded. This is the model of the pointed oval or leaf-shape flint. Sometimes one face is flatter than the other, being less worked, or in a few cases the unaltered flat side of a flake. Usually they are quite symmetrical, but occasionally one edge is more curved

than the other. The type illustrated in figure 182 is from Vernon county, Wisconsin. Other specimens are from western and central Wisconsin; eastern Tennessee; Miami and Scioto valleys, and central Ohio; southwestern Illinois; Kanawha valley; northeastern Kentucky; northeastern and southwestern Arkansas; northwestern and northeastern Georgia, and Savannah.

FIG. 183.—Chipped flint.

G. With convex edges and slightly convex base; being a medium between the triangular and the leaf-shape. Some are quite narrow and thick, others wide and thin; the former probably clubs or spear-heads, the latter knives. A good example, shown in figure 183, is from Savannah, Georgia. Others are from central Arkansas; central Ohio; eastern Tennessee; Kanawha valley; central North Carolina; southern Wisconsin; northwestern Georgia, and Savannah; northeastern Alabama; and South Carolina.

FIG. 185.—Chipped flint, large, long sharp point.

H. Pointed at each end; mostly elliptical, though sometimes widest near one end; from 5 to 12 inches long. Nearly all are thin and finely worked, with sharp edges. One from Cheatham county, Tennessee, has a deep notch on each edge about one-third of the way from one end, this end being somewhat rounded. The type (figure 184) is from Lonoke county, Arkansas. Other specimens are from central Arkansas, southwestern Illinois, northern and eastern Tennessee.

FIG. 184.—Chipped flint, large, pointed elliptical outline.

I. A similar pattern, but having one end continued into a narrow point, shown in figure 185, is from Bartow county, Georgia. Another of the same kind comes from Loudon county, Tennessee.

J. Similar to group *H*, but with the edges straight for more than half the length, probably to afford a more convenient hold for the hand.

The form is shown in figure 186, representing a specimen from Mississippi county, Arkansas. Others are from northwestern Georgia, southwestern Illinois, and northeastern Arkansas. There are a few similar in method of chipping to those of group *I*, but smaller and very narrow, from eastern and western Tennessee and northeastern Arkansas.

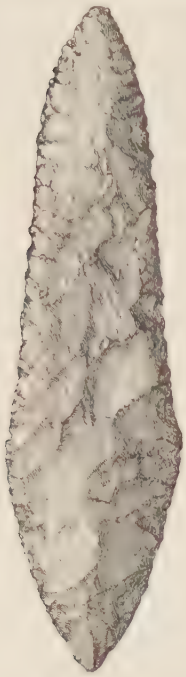


FIG. 186.—Chipped flint, large.

K. Double-pointed or lenticular in outline; quite symmetrical; from 2 to 4 inches long; thin and well worked. Represented in northeastern Arkansas; South Carolina; central and western North Carolina; eastern Tennessee; Scioto valley, and central Ohio; Kanawha valley; and northwestern Georgia.

L. With straight or concave base; edges diverging by straight or slightly convex lines for about half the length from the base, then curving to the point. There is considerable variation in the relative width of these, as well as the amount of concavity at the base. None with this outline of the edges has a convex base. From 2 to 6 inches long. The form is illustrated by figures 187 (from Lawrence county, Ohio), and 188 (from Blount county, Tennessee). In addition to the specimens figured, there is material in the collection from Scioto valley, Ohio; central and western North Carolina; Keokuk, Iowa; Brown county, Illinois; eastern Tennessee; northeastern Alabama, and Coosa valley in the same state; Kanawha valley; South Carolina; southern Wisconsin; and Savannah, Georgia.

FIG. 187.—Chipped flint.

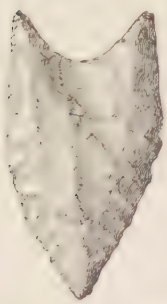


FIG. 188.—Chipped flint.

M. A modification of the last form in which the edge expands just at the base, forming a point at each corner or shoulder. Illustrated in figure 189. The specimen figured is from Forsyth county, Georgia. Others are from northwestern Georgia, and Savannah; eastern Tennessee; northeastern Kentucky; southwestern Wisconsin; and Kanawha valley.

FIG. 189.—Chipped flint, with shoulders.

SMALLER OBJECTS.

Small triangular or oval arrowpoints, differing from those previously described in being too small for any similar uses, few of them

being so much as two inches in length, and varying from that size to not more than half an inch. Nearly all are very thin, though some of the narrower ones may have a diamond or thick lenticular section. Some are very slender, so much so that they are usually classed as perforators; others are equilateral. Both the base and edges may be straight, convex, or concave. A few have a shallow notch in each edge just above the corner; nearly all, however, have both base and edge continuous.

FIG. 190.—Chipped flint, small.

FIG. 191.—Chipped flint, triangular.

The groups and subdivisions which have been recognized among the smaller chipped flint objects in the Bureau collection may be enumerated as follows:

A. Concave base. The concavity may vary from almost a straight line to one-third the length of the flint. Usually symmetric, as in figures 190 and 191, though sometimes one tang or barb, if it may be called such, is longer than the other, as in figure 192. A very few have beveled or serrated edges.

1. Convex edges. The type, shown in figure 190, is from Jefferson county, Tennessee. Other specimens are from eastern Tennessee; Union county, Mississippi; northwestern Georgia, and Bibb county and Savannah in the same state; central and western North Carolina; Miami and Scioto valleys and central Ohio; Kanawha valley, West Virginia; South Carolina; and southwestern Arkansas.

FIG. 192.—Chipped flint, asymmetric.

FIG. 193.—Chipped flint, concave edges.

2. Straight edges, as in the specimen illustrated in figure 191, from Ouachita county, Arkansas. Similar specimens are found in northeastern and southwestern Arkansas; western and central North Carolina; Kanawha valley; eastern Wisconsin; northwestern Georgia, and Savannah; eastern Tennessee; South Carolina; southwestern Illinois; Union county, Mississippi; and northeastern Kentucky.

FIG. 194.—Chipped flint, triangular.

3. Concave edges. This abundant form is illustrated in figures 192 (Cherokee county, Georgia), 193 (Caldwell county, North Carolina), and 194 (Washington county, Virginia). Other specimens are from northwestern Georgia and Savannah; central and western North Carolina; Kanawha valley; eastern Tennessee; northeastern Kentucky; southwestern Arkansas; South Carolina; Union county, Mississippi; and Coosa valley, Alabama. This subdivision of group *A* is abundant, as well as widely distributed.

B. With straight bases. These are all small, the broad ones being short and the long ones slender. Most of them are both short and narrow.

1. Convex edges as in figures 195 (McMinn county, Tennessee) and 196 (Bradley county, Tennessee). The form is widely distributed, being represented by specimens from eastern Tennessee; northeastern, southwestern, and southeastern Arkansas; Scioto valley, Ohio; northeastern Kentucky; northwestern Georgia and Savannah; Kanawha valley; Union county, Mississippi; Holt county, Missouri; northeastern Alabama, and Coosa valley in the same state; southern and southwestern Wisconsin; and western North Carolina.

FIG. 195.—Chipped flint, small.

FIG. 196.—Chipped flint, short, convex edges.

2. Straight edges. Exemplified by the specimen shown in figure 197, from McMinn county, Tennessee. Found also in eastern Tennessee; northeastern Arkansas; Coosa valley, Alabama; Union county, Mississippi; Kanawha valley; Miami and Scioto valleys, Ohio; eastern, southern, and southwestern Wisconsin; western and central North Carolina; Bartow county and Savannah, Georgia; South Carolina, and northeastern Kentucky.

FIG. 197.—Chipped flint, triangular.

FIG. 198.—Chipped flint, concave edges.

3. Concave edges, as in figure 198 (from Bledsoe county, Tennessee). Other examples of this class are from eastern Tennessee; Scioto valley, Ohio; northeastern and southwestern Arkansas; Kanawha valley, West Virginia; northeastern Kentucky; western and central North Carolina; northeastern Alabama; southwestern Illinois; and Savannah, Georgia.

C. Convex bases. Less abundant than the preceding, and the forms representing it are less variable. Its sub-groups are as follows:

1. Convex edges. Some of these have a slight reverse curve at the base, giving a slight barb or shoulder. A few are widest at or near the middle, with bases somewhat pointed, but most of them are widest at the junction of the base and edges. They are mostly of the leaf-shaped type, but quite small. Figure 199 (Mississippi county, Arkansas) is a good example. Others are from northeastern and southwestern Arkansas; northeastern Alabama and Coosa valley; Kanawha valley, West Virginia; eastern Tennessee; western and central North Carolina; northwestern Georgia; eastern Wisconsin; southwestern Illinois, and Miami valley, Ohio.

FIG. 199.—Chipped flint, convex base.

2. Edges concave or nearly straight. There are very few of this form, as nearly all with the base convex have the edges also convex. The type (figure 200) is from Lawrence county, Ohio; others are from Miami and Scioto valleys, Ohio; Kanawha valley; and southeastern and southwestern Arkansas.

FIG. 200.—Chipped flint, edges concave.

Two exceptional forms, which may be considered modifications of the triangular, come from eastern Tennessee and western North Carolina. The first, which is pentagonal, is shown in figure 201; the second, a medium between a perforator and a deeply serrated, triangular arrowpoint, is shown in figure 202.

FIG. 201.—Chipped flint, pentagonal.

While it is likely that the smaller flints, last described, were intended for arrows, it can not be stated with confidence whether they were for use in war or in hunting. It is said that some of the western Indians used barbless arrows with long, tapering blades, firmly attached to the shaft, for hunting, while for war barbed arrows, only slightly attached, were employed.[1]

FIG. 202.—Chipped flint, narrow and thick.

In many arrows with triangular points in the National Museum the sinew with which the flint is fastened to the shaft is brought over the corner or shoulder in such a way as to bind the point as firmly as could be done if it were barbed or stemmed, so that when the shaft is drawn from a wound the point must come with it. If an arrowhead of this form were inserted in a shaft, which was then wrapped behind the flint, the latter would remain in the wound when the shaft was withdrawn.

There is no reason for supposing that only the larger points were used for war purposes; the greater penetrating power of the thin, sharp ones would seem to fit them especially for such work, and it is probable that the smaller straight or tapering-stemmed flints (next to be described) were also utilized for this purpose, as they could be easily detached. Those with expanding stem may have been used for hunting, as they could be permanently fastened to the shaft.

STEMMED FLINTS.

The abundant and variable material of this class may roughly be grouped by form into two divisions, in the first of which the stem is tapering or straight, while in the second the stem is generally expanding.

STRAIGHT OR TAPER STEMS.

A. Square or rounded shoulders; stem concave at base; edges usually convex, rarely straight or concave. Nearly all are of quartzite or coarse

[1] Long; Exp. to Rocky Mountains, vol. I. p. 290. Dodge; Our Wild Indians, p. 418.

flint, roughly worked, the one illustrated (figure 203) being above the average, and are mostly from western North Carolina and the adjacent portions of South Carolina and Tennessee. All of them exceed three inches in length. Those from Savannah, Georgia, are usually much wider relative to the length than the specimens in the Bureau collection from other localities.

The specimen figured is from Montgomery county, North Carolina; others are from western and central North Carolina; Kanawha valley; eastern Tennessee; South Carolina; Coosa valley, Alabama; and northwestern Georgia and Savannah.

FIG. 203.—Chipped flint stemmed, barbless.

B. Similar to the last, except that the base is straight or convex, instead of concave. Large size, and nearly all of rough finish; mostly of argillite or flint, a few of quartzite. Varying considerably in width, as well as in thickness, some having almost a diamond section, others wide and thin, the latter generally having the edges worked quite sharp. Some are made from a large flake which has been dressed on one side only. One from Montgomery county, North Carolina, has the end opposite the stem worked round and sharp, similar to the blunt arrowheads, but its size excludes it from this class. From Savannah there are several which are chipped very thin, and smoothly finished, but they are exceptional; some from this locality are very large, reaching 5 by 3 inches, while others are almost as wide as they are long.

FIG. 204.—Chipped flint, stemmed, barbless.

The specimens of this form are chiefly from western and central North Carolina; eastern Tennessee; South Carolina; southwestern Georgia, and Savannah; eastern Wisconsin; southwestern Arkansas; southwestern Illinois; northwestern Alabama and Coosa valley in the same state; Kanawha valley, West Virginia; and central Ohio.

C. Of the same general form as the last, but much smaller, and finely worked. Most seem to be intended for arrowheads. The specimen illustrated in figure 204 is from Caldwell county, North Carolina; others are from South Carolina; western and central North Carolina; Union county, Mississippi; eastern Tennessee; Coosa valley and Tuscaloosa, Alabama; Miami valley, Ohio; Kanawha valley; northwestern and southwestern Georgia and Savannah; and southeastern Arkansas.

D. Convex edges; stem usually tapering with straight base, though it is noticeable that some are straight with convex base. Resembling the last in form, but slender; from $1\frac{3}{4}$ to $4\frac{1}{4}$ inches long. From western

and central North Carolina; Kanawha valley, West Virginia; and Savannah, Georgia.

FIG. 205.—Chipped flint, expanding shoulder.

E. Differing from specimen shown in figure 203, in having the edges expand at the shoulders in a projection or point, and varying more in size, some being small enough for arrowheads. All from Savannah (including the example shown in figure 205) are of smoother finish than those from other sections, and are usually larger, ranging from $2\frac{1}{2}$ to $4\frac{1}{2}$ inches long. There are some from this locality with base straight or convex. Found also in western and central North Carolina; Kanawha valley; South Carolina; eastern Tennessee; Coosa valley and northeastern Alabama; Brown county, Illinois; northeastern, southeastern, and southwestern Arkansas; and southwestern Georgia.

FIG. 206.—Chipped flint, double-curved edges.

F. Edge having a double curve, being convex toward the point, and curving outward at the shoulders. Few of them are barbed, though many have the shoulder much expanded. Base sometimes convex or concave, but more often straight; in a few it is somewhat pointed. In most of the smaller specimens the base is notched, but of these none are over $2\frac{1}{2}$ inches long. Stem tapering or expanding, rarely straight. A few have the base rubbed smooth and dull, or even polished (this feature appears in other forms, as noted); it seems to result from use as a knife or scraper, but the implement as a whole does not appear to be adapted to such use. None of them are over $3\frac{1}{2}$ inches long, except a few from Savannah; all from there are wide, but from other places the longer ones are all narrow.

FIG. 207.—Chipped flint, double-curved edges.

FIG. 208.—Chipped flint, convex edges, long, tapering stem.

The specimens illustrated (figures 206 and 207) are from Madison county, Alabama, and Kanawha valley, respectively. Others are from northeastern Alabama and Coosa valley; eastern Tennessee; northwestern and southwestern Georgia and Savannah; Kanawha valley; Catahoula parish, Louisiana; western and central North Carolina; southwestern Illinois and Brown county in the same state; South Carolina; southwestern Arkansas; and Miami valley, Ohio.

G. Convex edges; sharp points; stem always long and tapering; base somewhat pointed, or outline of whole stem forming a regular

curve. Some slightly barbed, but mostly with only a small shoulder. The specimens vary much in size, and also in delicacy of workmanship. Classed by function the group would probably be divided among several. The example shown in figure 208 is from Jackson county, Illinois. Others come from southwestern Illinois; eastern Tennessee; South Carolina; Kanawha valley; northeastern, southeastern, and southwestern Arkansas; western and central Arkansas; and southern Wisconsin.

FIG. 210.—Stemmed chipped flint, diamond or lozenge shape.

H. Similar to group *G*, save that the edges are straight while the stem is somewhat shorter. All the specimens are small. Found in western North Carolina; Kanawha valley, West Virginia; South Carolina; and southeastern Arkansas.

FIG. 209.—Chipped flint with long, tapering stem.

I. Differing from group *G* in having concave sides; none are barbed, and some have very wide shoulders. Nearly all are large. Two from Savannah have the base straight, all the others being of the common type. The type (fairly exemplified in figure 209) is from Union county, Illinois, and others come from southwestern Illinois; southwestern Arkansas; South Carolina; western North Carolina; Kanawha valley, West Virginia; eastern Tennessee; and Savannah, Georgia.

J. Lozenge or diamond shape; the four edges straight or nearly so, varying a little toward convexity or concavity. In some the base does not come to a point but is rounded or truncated; sometimes, though seldom, there is a slight shoulder. From $1\frac{1}{4}$ to $3\frac{1}{2}$ inches long. A typical example, shown in figure 210, is from Chester county, South Carolina. Additional material is from South Carolina; Kanawha valley; Brown and Ogle counties, Illinois; eastern Tennessee; western North Carolina; Bibb county and Savannah, Georgia; southeastern and southwestern Arkansas; Union county, Mississippi; and Coosa valley, Alabama.

FIG. 211.—Stemmed chipped flint.

K. Edges usually convex, sometimes nearly straight, gradually rounding off into the stem, which may be straight, tapering, or slightly expanding; base straight or slightly convex. All of these are narrow, mostly thick, and none over two inches long. The type (figure 211) is from Bledsoe county, Tennessee; others are from eastern Tennessee; western and central North Carolina; Coosa valley, Alabama; northwestern Georgia; eastern, southern, and southwestern Wisconsin;

Kanawha valley, West Virginia; South Carolina; Brown county, Illinois; and northeastern and southeastern Arkansas.

FIG. 212.—Stemmed chipped flint.

L. Edges convex, a very few being straight; shoulders square or somewhat rounded, in two or three somewhat expanding. Stem usually straight, sometimes tapering; base straight or convex. Varying much in size and relative width, being from 1¼ to 4½ inches long, and from ¾ to 2½ inches wide; some slender, others broad. Nearly all are quite roughly made. Illustrated in figure 212 (from Cherokee county, Georgia).

Like many other forms of small chipped implements, the distribution in this type is wide. It comes from northwestern Georgia and about Savannah; Kanawha valley, West Virginia; Miami valley, Ohio; southwestern Illinois; western and central North Carolina; eastern Tennessee; northeastern Alabama and Coosa valley in the same state; and southwestern Arkansas.

FIG. 213.—Stemmed chipped flint, ovoid.

M. Convex edges; sharp points; very slight shoulders; stem tapering by curved lines; base convex or somewhat pointed. All made of quartz, quartzite, or coarse flint, and differing from the following group only in being very slender and, owing to the material employed, much more roughly finished. Found in western North Carolina, in South Carolina, and in southwestern Arkansas.

N. Convex edges; remarkably symmetrical outline; most specimens finely finished; slight shoulders; tapering stem, with convex base, the whole stem having a quite regularly curved outline. From 2 to 4½ inches long.

FIG. 214.—Stemmed chipped flint, short blade.

The type which is shown in figure 213 is from Dane county, Wisconsin. This group also is widely distributed, being found in southern and southwestern Wisconsin; northeastern Kentucky; southwestern Illinois; Miami and Scioto valleys, Ohio, and the central part of the same state; northeastern, central, and southeastern Arkansas; western North Carolina; and Kanawha valley.

O. Differing from group *N* only in having longer stems and shorter blades, the latter sometimes less than an inch. Illustrated in figure 214 (from Kanawha valley). Found also in Scioto valley and in central Ohio; southwestern Wisconsin; southwestern Arkansas; and southwestern Georgia.

P. Convex edges; square shoulders; stem forming a quite regular and continuous curve, slightly expanding in some specimens. The one shown in figure 215, from Kanawha valley, West Virginia, has the most

symmetric outline of any specimen in the entire collection. There are other specimens from Kanawha valley, and also from northeastern Kentucky; Miami valley, Ohio; Washington county, Pennsylvania; eastern and western Tennessee; southwestern Illinois; and southeastern Arkansas.

Q. Similar to group *P* except that stem and base are straight. They are symmetric and well finished, vary more in size than those of the last group, being from 1¼ to 4¼ inches long, the others not reaching either of these limits.

The type (figure 216) comes from Knox county, Ohio, and other specimens from Miami valley and central Ohio; Keokuk, Iowa; northeastern Kentucky; Kanawha valley; eastern and western Tennessee; eastern, southeastern, and southwestern Arkansas; eastern and southwestern Wisconsin; northwestern Georgia; and southwestern Illinois.

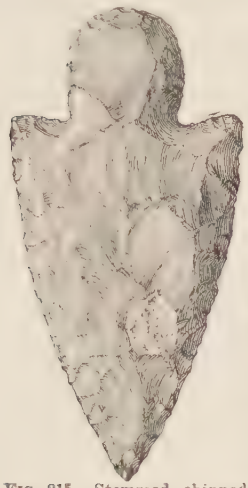


FIG. 215.—Stemmed chipped flint, symmetric outline.

R. Edges generally convex, sometimes straight; base straight or convex, only rarely concave; shoulders usually square, sometimes rounded; stem expanding by straight lines. From less than an inch to 3½ inches long, mostly about the medium.

FIG. 216.—Stemmed chipped flint.

The form, which resembles that shown in figure 216 in a general way, is widely distributed, its range including Keokuk, Iowa; Miami and Scioto valleys, Ohio; Bibb county and Savannah, Georgia, as well as the northwestern part of the state; eastern Tennessee; Kanawha valley, West Virginia; southeastern and southwestern Arkansas; southwestern Illinois, and Brown county in the same state; northeastern Kentucky; southern and southwestern Wisconsin; western and central North Carolina; and northeastern Alabama.

S. Differing from group *Q* in having the blade short, stem long (in some cases longer than blade), and only slight shoulders. Base somewhat convex in a few specimens; from an inch to 2¾ inches in length. From Kanawha valley; northwestern Georgia; Miami and Scioto valleys, Ohio; southwestern Arkansas; southern Wisconsin; and northeastern Alabama.

Beginning with those of group *N* and ending with those last described, all the best worked and most finely finished specimens are from Kanawha valley, West Virginia; northeastern Kentucky, and the central and southern parts of Ohio.

T. Convex edges; square shoulders; slender; very long and slender tapering or straight stem, coming almost to a point at the base. Illus-

trated in figure 217 (from Kanawha valley). Others are from central North Carolina; Kanawha valley; southwestern Arkansas; and Catahoula parish, Louisiana. The specimens from the two latter districts have the stem wider and less pointed than the others.

FIG. 217.—Chipped flint, with very long, slender stem.

U. With one large, much expanded shoulder, the other being absent or very slight; both edges convex, or one convex and the other straight; stem sometimes straight, but usually tapering, being almost pointed in some; base usually convex, sometimes straight, rarely concave. A specimen from Ross county, Ohio, has the base deeply notched; it seems to have been symmetrical originally, and one barb or shoulder being broken, to have had that edge dressed down. Many were thus reworked, but in most cases it is evident that the form is original. Some are slender, others broad.

FIG. 218.—Stemmed chipped flint, with but one barb or shoulder.

The type shown in figure 218 is from Bowie county, Texas. Other examples are from southwestern Arkansas; Catahoula parish, Louisiana; Scioto valley, Ohio; Kanawha valley; western and central North Carolina; eastern Tennessee; South Carolina; northeastern Alabama; as well as from northwestern Georgia and about Savannah.

EXPANDING STEMS.

In this class of flints the stem is expanding, unless the contrary is stated. The majority of specimens having barbs belong to this class; while those with straight or tapering stem usually have only square or rounded shoulders, the barb seldom appearing.

FIG. 219.—Stemmed chipped flint, short.

A. Short and broad; base usually straight, sometimes convex, rarely concave; notched in from edges to form the stem; very seldom with well-defined shoulders, and never barbed. The type, illustrated in figure 219, is from Kanawha valley, West Virginia. Found also in northeastern Kentucky; western North Carolina; northwestern Georgia and about Savannah; eastern Tennessee; Coosa valley, Alabama; and Union county, Mississippi.

FIG. 220.—Stemmed chipped flint.

B. Edges convex, seldom straight; base straight or rarely convex or concave; notched in on edges close to base, so as to leave a slight

tang; thin and well worked; from an inch to 2½ inches long. All from Savannah have concave bases; a few are notched so as to have slight shoulders, and they are somewhat larger than from other localities. They fit better in this group, however, than in any other. A typical example, shown in figure 220, is from Montgomery county, North Carolina. Others are from central North Carolina; eastern Tennessee; southwestern Illinois; various localities in South Carolina; and about Savannah, Georgia.

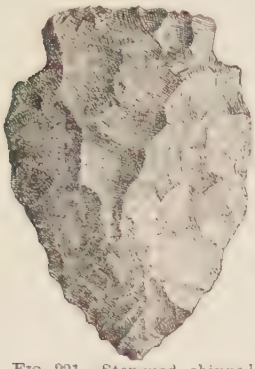


FIG. 221.—Stemmed chipped flint, roughly made.

FIG. 222.—Stemmed chipped flint.

C. Roughly made; unsymmetrical, seemingly made hastily; of various patterns, including all the common shapes. Nearly all with convex edges, few straight, none concave. Base straight or concave, often the natural surface or fracture of the stone. Sometimes made from the tip of a broken larger specimen. From 1 to 5 inches long; slender or wide; usually thick, except when made from a thin flake. Edges notched just at the base in some, leaving a slight tang; others have the corners chipped out. This group is quite variable in size and in character of workmanship, as well as in form. The material also is variable.

The types (figures 221 and 222) are, respectively, from Bledsoe and Polk counties, Tennessee. The range includes eastern Tennessee; Kanawha valley; western North Carolina; eastern and southwestern Wisconsin; northeastern Alabama and Tuscaloosa valley; South Carolina; southwestern and northeastern Arkansas; central Ohio and Scioto valley; northeastern Kentucky; and southwestern Georgia, as well as Savannah.

FIG. 223.—Stemmed chipped flint.

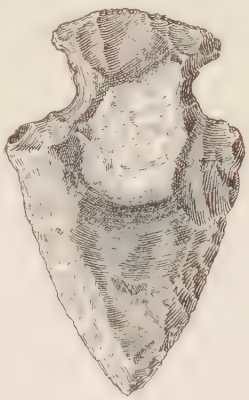


FIG. 224.—Stemmed chipped flint, edges convex.

D. Edges convex, rarely straight; base straight or convex; slender; from 1¼ to 4 inches long; usually thin; deeply notched, with edges worked close to base, leaving the latter as wide as the blade, or nearly so. This form could be quite firmly attached to a shaft or handle. It is illustrated by figure 223, representing one of the specimens from Kanawha valley. It is found also in southwestern Illinois and Brown county in the same state; eastern, southern, and southwestern Wisconsin; western and central North Carolina; eastern Tennessee; northwestern Georgia; central Ohio and Scioto valley; southeastern

Arkansas; northeastern Kentucky; and Coosa and Tuscaloosa valleys, Alabama.

FIG. 225.—Stemmed chipped flint, with long barbs

E. Edges convex; base straight or convex; shoulders square or rounded; stem expanding by curved lines. A few are small enough for arrows, but most of them are large or of medium size. The specimen from Vernon county, Wisconsin, illustrated in figure 224, is representative. The group is characteristic of southwestern Wisconsin; Kanawha valley; central Ohio and Scioto valley; western and central North Carolina; eastern Tennessee; southeastern and southwestern Arkansas; southwestern Illinois; South Carolina; Coosa valley, Alabama; and Savannah, Georgia.

F. Edges straight or convex; long barbs, sometimes reaching to the base; stem straight or slightly tapering; base straight, or very slightly convex or concave, usually well finished. One barb is sometimes longer than the other, or the stem may be to one side of the center line. Sometimes made of a flake, the flat side being left untouched.

The type shown in figure 225 is from Madison county, Alabama. It is found generally in northeastern and northwestern Alabama, and also in eastern Tennessee; Kanawha valley; Keokuk, Iowa; Holt county, Missouri; southwestern Illinois and Brown county in the same state; northwestern Georgia and about Savannah; southeastern and southwestern Arkansas; northeastern Kentucky, and western and central North Carolina.

G. Similar to the last, but with stem expanding by straight or curved lines; base always straight in larger specimens, sometimes convex or concave in smaller ones. Barbs varying in length, short in some and reaching nearly to the base in others. From three-fourths to $3\frac{3}{4}$ inches in length, and varying much in width.

FIG. 226.—Stemmed chipped flint.

Figure 226 represents a typical example from Jackson county, Illinois. The range, which is quite wide, includes southwestern Illinois; northeastern, southwestern, and southeastern Arkansas; Miami and Scioto valleys, and central Ohio; southern and southwestern Wisconsin; western and central North Carolina; eastern Tennessee; South Carolina; northeastern Kentucky; Kanawha valley; and Savannah, Georgia.

H. Wide blade; short; convex edges; square shoulders or slight barbs; base convex or concave; stem broad and expanding by curved

lines; generally thick. Those with convex base are all of medium size, while those with concave base range from an inch to 4 inches in length.

The form is indicated in figure 227, representing a good specimen from Dane county, Wisconsin. It is found over southern Wisconsin; northeastern Alabama and Coosa valley; southwestern Illinois and Brown county in the same state; central North Carolina; northwestern Georgia and about Savannah; eastern Tennessee; Miami and Scioto valleys, Ohio; Kanawha valley; southwestern Arkansas; South Carolina; and Keokuk, Iowa.

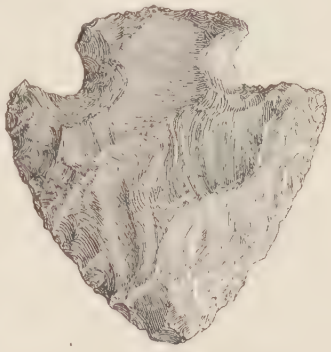


FIG. 227.—Stemmed chipped flint.

I. Edges parallel, or nearly so most of the length, with abrupt curve to the point; base straight or slightly convex; stem expanding by straight or curved lines; notched in from the corners of the base giving long barbs, which, in a few, project slightly beyond the line of edges; thin; well worked; from 2 to 4 inches long.

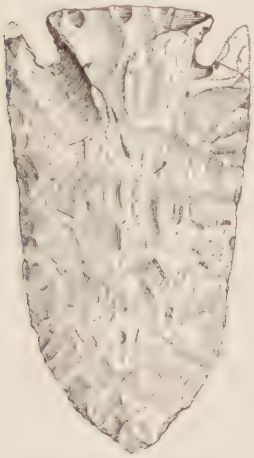


FIG. 228.—Stemmed chipped flint, broad point.

The specimen illustrated in figure 228 is from Dane county, Wisconsin, and there are several others from southern Wisconsin; southwestern Illinois; Scioto valley, Ohio; and Kanawha valley, West Virginia.

FIG. 229.—Stemmed chipped flint, slender point.

J. Edges convex or sometimes straight; base straight or slightly convex. Notched in on the edges, leaving the stem nearly or quite as wide at the bottom as the blade; corners of the base square or slightly rounded. Mostly small, suitable for arrows, though a few are larger, up to $3\frac{1}{4}$ inches. A few of these have the base polished. Some of the small ones are made of flakes having the natural, conchoidal shape and worked on one side only. Typical forms, shown in figures 229 and 230, are from Kanawha valley, and Nicholas county, Kentucky, respectively. The distribution extends also over southern and southwestern Wisconsin; Miami valley, Ohio; Holt county, Missouri; northeastern Kentucky; Brown county, Illinois;. southwestern Arkansas; Coosa valley, Alabama; eastern Tennessee, and about Savannah, Georgia.

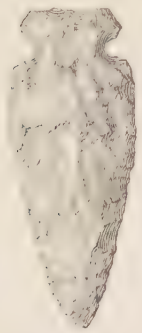


FIG. 230.—Stemmed chipped flint.

K. Straight or convex edges (a few serrated or beveled); base straight, sometimes polished; notched in from the corners so as to give sharp barbs, with wide stem expanding by straight lines. Medium size. Illustrated in figure 231 (Bradley county, Tennessee). Found in eastern Tennessee; southwestern Illinois; Scioto valley; Kanawha valley; South Carolina; and about Savannah, Georgia.

FIG. 231.—Stemmed chipped flint.

FIG. 232.—Stemmed chipped flint, thin.

L. Very thin; well worked; usually quite symmetrical; base straight or slightly concave; stem expanding by curved lines; with shoulders or barbs; base with sharp tangs. Some specimens quite slender, others almost as wide as long. Few are above two inches in length. The edge is sometimes a broken line instead of a regular curve. The form is shown in figures 232 and 233, representing specimens from Lawrence county, Ohio, and Loudon county, Tennessee, respectively. Others are from Kanawha valley; Miami and Scioto valleys, Ohio; eastern Tennessee; western and central North Carolina; Union county, Mississippi; northeastern Kentucky; and southwestern Illinois.

FIG. 233.—Stemmed chipped flint.

FIG. 234.—Stemmed chipped flint.

M. Convex edges; usually quite symmetric; base generally straight, although sometimes convex or concave; stem expanding by straight or curved lines, and notched in from the corners by a narrow notch whose sides are parallel. Sometimes beveled (or feathered). The barb as well as the notch of the same width throughout its entire length. The type (figure 234) is from Knox county, Ohio, and similar forms come from central Ohio; Kanawha valley; western North Carolina; southern Wisconsin; southwestern Illinois; South Carolina; eastern Tennessee; and Savannah, Georgia.

FIG. 235.—Stemmed chipped flint.

N. Straight, or rarely convex, edges; base straight or slightly curved, with rounded corners; notched in on the edges above the corners, with sharp barbs. Nearly every specimen is beveled, and some are serrated. Base polished in many of them even when slightly concave. A good example from Ross county, Ohio, is represented in figure 235. Others are from Miami and Scioto valleys and elsewhere in Ohio, as well as from Kanawha valley; eastern Tennessee; north-

western Alabama; southwestern Georgia, and about Savannah in the same state. The style of chipping is frequently such as to give serrated edges, as in the specimen figured.

O. Long; slender; thin; short, small stem; convex base; notched upward from the corners of the base; short barbs. The type shown in figure 236 is from Loudon county, Tennessee, and other specimens come from eastern Tennessee and southeastern Arkansas.

FIG. 236.—Stemmed chipped flint, slender, with small stem.

P. Convex edges and base; sometimes, though very seldom, the edges are nearly straight; the typical, leaf-shape implement, except for the notch, which is always worked in from the widest part of the specimen at right angles to the axis. The base is invariably polished, even in the smallest specimens. From Licking county (figure 237) as well as from Miami valley and throughout central Ohio; Kanawha valley; eastern Tennessee; southwestern Illinois; northeastern Alabama; southern Wisconsin; and about Savannah, Georgia.

Q. Edges less convex than the last, sometimes straight; the notches are worked in nearer the base, going in an angle of about 45 degrees, instead of perpendicular to the middle line or axis. Sometimes the blade is of uniform thickness until very close to the edges, which are worked off in a double chisel-edge. Very few of these, or of group *P*, are small enough for arrows. Usually symmetrical and well finished; the base always polished, but whether from use or to add to the utility of the specimen can not be determined. From Miami valley, Ohio; Keokuk, Iowa; southwestern Wisconsin; and eastern Tennessee.

FIG. 237.—Stemmed chipped flint, oval outline, notched.

R. Differing from the two last described only in being longer, and in having the stem always come to a point by either convex or concave lines, instead of being regularly convex; base never polished. From Kanawha valley, West Virginia, and central Arkansas.

S. Edges usually straight, sometimes concave, rarely convex; notched in deeply from edges; seldom barbed; stem nearly always wider than the blade, and large. Base convex; occasionally somewhat concave with rounded corners, and nearly always polished. Some (including all from the Savannah collection) are beveled and a few have blunt and rounded points, apparently broken specimens reworked. From less than an inch to nearly 3 inches long. Even among the very small ones, some have the base polished.

An implement of this form, or of any form in which the stem is wide or with very long tangs, and especially with concave base, would be well adapted for hunting purposes. The wide stem would allow firm

attachment to a shaft, whether as an arrow or a spear, and at the same time would be very difficult to withdraw from a wound. The shaft would impede the flight of an animal pierced by the weapon, particularly in weeds or bushes; though greater force would be required with these than with the more slender points to make them effective.

FIG. 238.—Stemmed chipped flint.

The type delineated in figure 238 is from Warren county, Ohio, and the form is well represented also in Scioto and Miami valleys, Ohio; western North Carolina; Kanawha valley; eastern Tennessee; southern and southwestern Wisconsin; southeastern and southwestern Arkansas; northeastern Kentucky; northeastern Alabama; and about Savannah, Georgia.

FIG. 239.—Stemmed chipped flint, notched, very wide stem.

T. Convex edges; base straight, or slightly convex or concave, with square corners, and nearly always polished; stem as wide as the blade or wider. Some rather slender, others as wide as long. Very few are beveled, except those from Savannah, all of which are thus made. From three-fourths to 2¼ inches long. Found in eastern Tennessee; Kanawha valley (including the specimen shown in figure 239); western North Carolina; southern and southwestern Wisconsin; South Carolina; southwestern Arkansas; Miami valley, Ohio; and in the vicinity of Savannah.

FIG. 240.—Stemmed chipped flint, notched, very wide stem.

U. Edges usually straight, sometimes convex; base regularly concave, or rounding off into a convex curve at the corners, and nearly always polished. The stem in all is wider than the blade. Those from Savannah are all beveled, and but few of them have polished bases. The type, illustrated in figure 240, is from Kanawha valley, and others come from Kanawha valley; southern Wisconsin; Scioto valley; eastern Tennessee; southwestern Illinois; and Savannah, Georgia.

V. Edges convex, seldom straight, never concave; usually well finished; base concave; notch worked in from the edge above the corner so as to leave the upper portion of the tang parallel to the lower, or base; corners square. Few are beveled. The length is from 1 to 4 inches,

the width also varying considerably; some are widest at or near the middle of the blade, others are as wide at base as at any other part.

The form is illustrated in figure 241 (Union county, Illinois). The distribution is wide, including southwestern Illinois; northwestern and southwestern Georgia and Savannah; northeastern Kentucky; Kanawha valley; South Carolina; northwestern Alabama; eastern Tennessee; eastern and southern Wisconsin; western and central North Carolina; southeastern and southwestern Arkansas; Miami valley, Ohio; Keokuk, Iowa; and Union county, Mississippi.

FIG. 241.—Stemmed chipped flint.

W. Edges usually convex, sometimes straight; notched in on the edges above the corners; base concave; some slender, others broad. Somewhat resembling the two preceding types, but more roughly made. From 1 to 4 inches long. Represented by material from western and central North Carolina; Kanawha valley; eastern Tennessee; northeastern Alabama and Coosa valley, as well as from Miami valley, Ohio.

X. Small; very slender; convex edges, with wing-like barbs or shoulders; stem slightly expanding by curved lines. This rather rare type, shown in figure 242 (from Ouachita county, Arkansas), is known from northeastern and southwestern Arkansas, as well as eastern Tennessee, and Savannah, Georgia.

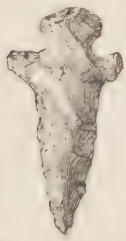


FIG. 242.—Stemmed chipped flint, projecting shoulders.

Y. Edges mostly straight, in a few convex; base straight, convex, or concave, in some specimens of each being polished; notched in on the edges just above the corners, notches usually slight; always widest at base. A few, including all from Savannah, are serrated or beveled. Very few are over an inch and a half long. They are nearly always thick. One from Kanawha valley has the point worn perfectly smooth and the edges polished half way to the base, showing use as a drill. Points of this form would make the countersunk holes so common in gorgets and other flat stones.

This form is widely distributed. The type (figure 243) is from Lawrence county, Ohio. Its range includes Miami and Scioto valleys, Ohio; northwestern Georgia and Savannah; eastern Tennessee; Kanawha valley; southwestern Illinois, and Brown county in the same state; western North Carolina; Coosa valley, Alabama; southwestern Arkansas; South Carolina; northeastern Kentucky; and eastern Wisconsin.

FIG. 243.—Stemmed chipped flint.

Z. Very rough finish; blade more or less worked by first chipping (there being usually no secondary chipping) to convex edges; base generally the natural surface of the nodule or pebble from which the implement was made; notches worked

in roughly on the edges. They were probably knives or spears, or in some cases celts or chisels, though none show polish. With these are placed a few that seem to be the points of larger rough implements, broken and having notches worked in the fragments. A typical form, shown in figure 244, is from Mississippi county, Arkansas. It occurs also in northeastern Arkansas; Scioto valley, Ohio; western Tennessee; southwestern Illinois; and Kanawha valley, West Virginia.

Perforators.

Character and uses.

The implements variously classed by different writers as awls, drills, needles, rimmers or reamers, and the like, seem to represent a graded series, and as no distinction can be made in the different kinds, if, indeed, there is any room for distinction, they are grouped under one term, "perforators."

Very few of the specimens could be used as drills, as most of them are too thin; only those with a rhomboidal or triangular section would seem adapted to this purpose, and the majority even of these seem too fragile. It is more probable that drilling was done with a stick or horn with sand as a cutting medium, except in the thin tablets of slate or similar stone and in shells. The thicker flints would answer very well for this purpose, and the countersunk holes appear to indicate such an instrument. For sewing, bone would be more easily worked, and better suited than flint. The double-pointed slender specimens may have been used for bait-holders in fishing; bone implements of a similar shape, with a hole drilled at the middle for attaching a line, have been seen in use among the Indians of Florida.

Fig. 244.—Stemmed chipped flint, very rough.

Some such implement was no doubt used in the manner of a burin, especially in making the fine lines on the ornamented shells or stones; certain flints in the collection may have served such a purpose.

Lubbock considers it proved that the stone of which ornaments, carved axes, etc., are made could be worked with flint, and that the engraving on the Scotch rocks, even on granite, was executed with this material;[1] and Bushmen are known to use triangular pieces of flint for cutting figures in rocks.[2] Evans[3] observes that there are five ways of making holes in stone, viz: (1) Chiseling or picking, with "picks," "celts," or "drills" of flint or other stone; (2) boring with a solid borer, as wood, hard or soft, or horn with sand and water; (3) grinding with a tubular grinder, as horn, cane, elder, etc., with sand and water; (4) drilling with a stone

[1] Prehistoric Times, p. 122.
[2] Holub, E., in Jour. Anth. Inst. Gt. Br. and Ird., vol. x, p. 460.
[3] Stone Implements, p. 48.

drill, e. g., of flint or sandstone; (5) drilling or punching with metal. It should be remembered that there are no evidences of the use of any metal except copper for economic purposes by the aborigines of the United States; and nearly everything of this material seems to have been ornamental in character. Bancroft says that the Nootka, in boring in wood, use a bird-bone drill worked between the hands,[1] while according to Schumacher, the Santa Barbara Indians chip out rough disks of shell, pierce them with a flint drill, and enlarge the hole with a slender, round piece of sandstone.[2] The Atlantic coast Indians drilled shell beads with a nail stuck in a cane or stick, rolling the drill on their thighs with the right hand, and holding the shell in the left;[3] and the southern Indians, according to C. C. Jones, pierced shell beads with heated copper drills.[4] Evans has found that ox-horn and sand make good borers,[5] while low tribes on the Amazon make crystal tubes an inch in diameter and up to 8 inches long by rubbing and drilling with a flexible shoot of wild plantain, twirled between the hands, with sand and water;[6] and Tylor expresses the opinion that such operations are not the result of high mechanical skill, but merely of the most simple and savage processes.[7]

FIG. 245.—Perforator, not stemmed.

STEMLESS FORMS.

A. Base straight or nearly so; edges straight and parallel, sometimes half the length from the base, thence with concave curve which is reversed near the end to give a blunt point; these, usually the wider ones, are always thin, and were probably knives. The smaller ones, resembling the small triangular arrows except for the sharpened upper end, may have been for arrowheads, though the sharp points would have served well as awls or needles. Many of the smaller ones seem to be made from small broken arrowheads; exemplified by the specimen from Montgomery county, North Carolina, shown in figure 245. The collection includes material from western and central North Carolina; eastern Tennessee; Kanawha valley; northeastern Alabama; South Carolina; Keokuk, Iowa; and Savannah, Georgia.

FIG. 246.—Perforator, not stemmed, double pointed.

B. Slender, somewhat larger about the middle and tapering to a point at each end, or regularly and gradually decreasing

[1] Native Races, vol. I, p. 189.
[2] Hayden Surv., Bul. 3, 1877, p. 43.
[3] Brickell; Nat. Hist. of N. C., p. 339.
[4] Antiq. of the Southern Indians, p. 230.
[5] Stone Implements, p. 46.
[6] Stevens; Flint Chips, p. 96. Tylor; Early History of Mankind, p. 188.
[7] It would seem that in using a wood or horn drill, water would be a disadvantage, as the drill would swell and wear rapidly away when wet, thus choking the bore. The sand also would be forced into the drill instead of sticking to its surface, thus being less effective.

from base to point. Some are undoubtedly arrowheads, as they are too blunt or too thin to have been used for piercing. Others show marks of use which could have been produced in no way except by drilling in stone. The specimen illustrated in figure 246 (from Kanawha valley) shows this to a marked degree, while that shown in figure 247 (from Nicholas county, Kentucky) is without such indications. The distribution of this form is wide, including Kanawha valley; northeastern Kentucky; southwestern Illinois; southwestern Arkansas; southwestern Wisconsin; Coosa valley, Alabama; northwestern and southwestern Georgia, and Savannah; eastern Tennessee; and Scioto valley, Ohio.

FIG. 247.—Perforator, not stemmed, double pointed.

FIG. 248.—Perforator, not stemmed, rough base.

C. With the base very large in ratio to the point or piercer; sometimes the entire implement is worked smooth or thin, again it is the natural fragment or chip of stone entirely unworked except a point flaked on one part or edge. The piercer varies from one-fourth of an inch to two inches in length. It could have been utilized only as an "awl" or "needle," the base being held by the thumb and finger. This variable form is represented in figure 248 (from Lawrence county, Ohio). It comes from Scioto valley; Kanawha valley; western and central North Carolina; northeastern Kentucky; Keokuk, Iowa; southwestern and southeastern Arkansas; eastern Tennessee; and Savannah, Georgia.

D. Piercer thin and slender; base thin, expanding to a wing-like projection on each side. Very few are strong enough to have been used for drilling even in soft material, but they are excellent for piercing leather or similar substances. The expanding wings would make them good points for hunting and fishing arrows, as they would have great penetrating power and be very difficult to extract from a wound, while allowing very firm attachment to a shaft. The type, shown in figure 249, is from Kanawha valley. Other specimens come from the same locality, and also from southwestern Illinois, and Brown county in the same state; eastern Tennessee; Keokuk, Iowa; Scioto valley, Ohio; northeastern Kentucky; southern Wisconsin; and Savannah, Georgia.

FIG. 249.—Perforator, not stemmed, expanding base.

FIG. 250.—Perforator, not stemmed, expanding base.

E. With slight expansion at the base. These may be thick or thin, wide or narrow, and, according to their different forms, might be used

as drills, piercers, or arrowheads. A good example (presented in figure 250) is from Kanawha valley, West Virginia. It is found also in northeastern Kentucky, northeastern and southeastern Arkansas; eastern Tennessee; southwestern Illinois; and southwestern Wisconsin.

All of the foregoing perforators are without stems, unless the larger portion left at the base may be considered as such.

STEMMED FORMS.

The form of the stem and shoulders among perforators is often the same as in the stemmed arrowheads, etc., previously described.

FIG. 251.—Perforator, stemmed.

A. Stem usually tapering; shoulder more or less defined; never barbed; blade wide at the part next to the stem, tapering rapidly by concave lines to a sharp point. Probably spearpoints or large arrowheads with the blade worked to a point. The type, shown in figure 251, is from Kanawha valley.

FIG. 252.—Perforator, stemmed, very wide shoulders.

B. Slender point; wide wings or shoulders; stem straight or nearly so; the implement having the form of a cross. Some are less than an inch long, and very delicately worked, while others reach 3 inches in length, and are thick. Some from Savannah have very broad stems. There is a good example (figure 252) from Ouachita county, Arkansas, and others from southwestern Arkansas; western North Carolina; and Savannah, Georgia.

FIG. 253.—Perforator, stemmed.

C. Narrow and thick, almost of a diamond or round section; stem expanding or straight; with slight shoulders, sometimes slightly barbed. Some of the thinner ones, probably arrows, have a lenticular section; a few are triangular in section.

FIG. 254.—Perforator, stemmed.

This form is well suited for drilling, and many of the specimens show marks of such use, especially the one illustrated (figure 253), the edges of which are striated almost the entire length. This is from Mason county, Kentucky; and the distribution of the type includes Kanawha valley; Scioto valley, Ohio; eastern Tennessee; northeastern Alabama; western and central North Carolina; southeastern and northeastern

Arkansas; Brown county, Illinois; South Carolina; and northeastern Kentucky. Thus the type is common and its geographic range broad.

D. Long, slender point; shoulders wide or slightly barbed; stem straight, tapering, or expanding; edges straight or concave. Some would make good piercers for soft material, but very few could be used as drills. A majority would be good arrowheads. Some have the edges smooth, but if this was caused by drilling it must have been done in enlarging holes already made, since the implements so marked are very thin. The faces of the blades show no polish or smoothness, such as might result from use as knives. The specimen illustrated (figure 254) is from Madison county, Alabama; others from northeastern Alabama and Coosa valley; Scioto valley, Ohio; eastern Tennessee; western and central North Carolina; southwestern Arkansas; Kanawha valley; and Savannah, Georgia.

FIG. 255.—Perforator, stemmed, with cutting point.

E. Stem may be of any form; wide shoulders; never barbed; point or piercer narrow, well worked, with edges parallel its entire length, and terminating in a cutting edge instead of a point. This form (shown in figure 255) is found only in the collection from Savannah, Georgia.

BLUNT ARROWHEADS, OR "BUNTS."

Certain arrowheads have the end opposite the base rounded or flattened instead of pointed. Commonly, both faces are worked off equally, to bring the edge opposite the middle line of the blade, though sometimes it may be a little to one side. The stem and base are of any form found in the common patterns of arrowheads. Few are barbed, though many have shoulders. For the most part, they are probably made from the ordinary spearpoints or arrowheads and knives that have had the points broken off, though some seem to have been intentionally made this way originally. A few are smooth or polished at the ends, as though used as knives or scrapers; but most of them have no marks except such as would result from being struck or shot against some hard substance; even this being absent in many of them, as in the specimen represented in the accompanying figure.

FIG. 256.—Blunt arrowhead, or "bunt."

Jones says that crescent-shaped arrows were used by southern Indians for shooting off birds' heads,[1] and it is known that chisel-shape arrows were much used during the Middle Ages.[2]

This type of aboriginal implement or weapon is shown in figure 256, representing a specimen from Savannah, Georgia. Other examples

[1] Quoted by Dawson; Fossil Men, p. 124.

[2] Evans; Stone Implements, p. 253.

come from eastern Tennessee; Kanawha valley; western North Carolina; southern and southwestern Wisconsin; southwestern Illinois; Scioto valley, Ohio; and Savannah, Georgia.

SCRAPERS.

STEMMED.

The same remarks as to form and method of making apply to stemmed scrapers as to blunt arrows, except that the chipping of the end is always from one face so as to produce a chisel edge. This edge is frequently smooth or polished from use. They would answer very well for smoothing down articles made of wood, or for cleaning hides in tanning; they would also serve excellently for removing scales from fish, and as they are usually abundant in the vicinity of good fishing places, they were no doubt employed for this purpose.

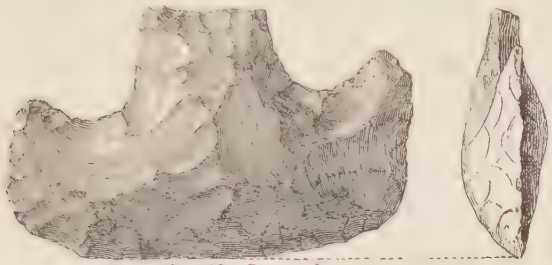


FIG. 257.—Stemmed scraper.

The material in the Bureau collection is represented by the specimens shown in figures 257 and 258, from Savannah, Georgia, and Dane county, Wisconsin, respectively. Other examples come from southern Wisconsin; southwestern Illinois; Kanawha valley, West Virginia; northeastern Kentucky; Miami valley, Ohio; central North Carolina; eastern Tennessee; and Savannah, Georgia.

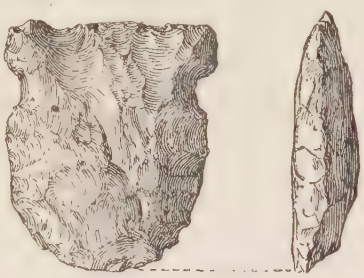


FIG. 258.—Stemmed scraper.

STEMLESS.

A few quotations regarding the use and mode of manufacture of stemless scrapers may be given:

According to Evans, they are made by laying a flake flat side up on a stone, and chipping off around the edge with a hammer. The point struck must rest directly on the under stone, and but a thin spall is struck off at each blow.[1] Leidy observed that the Shoshoni by a quick blow strike off a segment of a quartz bowlder in such a way as to form a circular or oval implement flat on one side, convex on the other, which is used as a scraper in dressing buffalo hides;[2] and according to Knight the Australians obtain, in exactly the same way, specimens which they use as axes.[3] Peale remarks that while hides are green they are stretched on the ground and scraped with an instrument resembling an adze;[4] and Dodge says more explicitly that when the stretched skin has become hard and dry, the woman goes to work on it with an adze-like

[1] Stone Implements.
[2] Hayden Survey, 1872, p. 653.
[3] Smithsonian Report for 1879, p. 236.
[4] Ibid, 1870, p. 390.

instrument, with a short handle of wood or elkhorn tied on with rawhide; holding this in one hand, she chips at the hardened skin, cutting off a thin shaving at every blow.[1]

The scrapers of this class in the Bureau collection are as follows:

A. Chipped over the entire surface to the form of the ordinary celt, except that the scraping edge is in the same plane with one face. Some have a scraping edge at each end. In a few the flat or straight face is chipped off slightly, bringing the edge toward the middle line; but this was probably done after the implement had become broken or blunted from use. When there is any polish, it is always on the flat face, showing use as an adze, or, possibly, as a plane. Varying much in width, some measuring almost the same in either direction, while others are more like the "chisel" celts, though the position of the cutting edge shows their use.

FIG. 259.—Stemless scraper, celt form.

A typical specimen (figure 259) is from Jackson county, Illinois; others come from Brown county and the southwestern part of the state generally; from northeastern Kentucky; Keokuk, Iowa; southwestern Wisconsin; eastern Tennessee; and central Ohio.

FIG. 260.—Stemless scraper, flake.

B. Flakes or spalls, chipped always from the concave side of the fragment. Some of the smaller specimens, usually those of somewhat circular outline, are chipped nearly, or in some cases entirely, around the edge. Figure 260 represents a specimen from Mason county, Kentucky. Others come from northeastern Kentucky; eastern Tennessee; Holt county, Missouri; Kanawha valley; southwestern Wisconsin; Miami valley, and central Ohio; Coosa valley, Alabama; Union county, Mississippi; and Savannah, Georgia.

CORES.

The generally accepted name "cores" is applied to the blocks from which are struck off the flakes to be next described.

Dr. Gillespie[2] claimed that objects of this kind were made so intentionally, and that the flakes are simply the refuse or waste material.

[1] Our Wild Indians, p. 256.

[2] Gillespie, Dr. W.; Jour. Anth. Inst. Gt. Br. and Ird., vol. VI, p. 260.

He gives six reasons for this belief, but an examination of the objects themselves would show that he is in error. That some might have been used as scrapers may be true, but very few are suited for such work, and not one shows the least mark of wear that could result from this use.

The specimens in the Bureau collection, with perhaps half a dozen exceptions, are from the aboriginal quarries at Flint ridge, in Licking county, Ohio, or of the material so abundant at that place.

All are small, few being of a size to furnish flakes over three inches long. The flakes were undoubtedly struck off by means of stone hammers, hundreds of which are to be found about the quarries, or removed by pressure, many showing the bulb of percussion, others being perfectly smooth on the flat face. Usually all the flakes were obtained from only one side of the core until it became too small to work (figure 261). Occasionally they were chipped from opposite sides, leaving the core of a conical or cylindrical shape (as represented in figure 262).

FIG. 261.—Cores.

FIG. 262.—Core.

Cores and finely chipped implements of the Flint ridge stone have been taken from the mounds in Kanawha valley, West Virginia, and Scioto valley, Ohio, showing that the mound builders are to be credited with at least a part of the great amount of work done in those localities; but it seems a mistake to say, as some authors have done, that the "turtlebacks" found in caches in southern Illinois are from the same source, as the stone is entirely different, and occurs abundantly in the vicinity in which the specimens are found.

FLAKES.

The use to which were put the narrow, thin flakes so abundantly found in many parts of the world has caused some discussion. Schoolcraft says that the Dakota bleed patients by scarifying with these flakes; or sometimes one is fixed into the end of a piece of wood, held over a vein, and driven in as far as the wood will let it go,[1] the use being similar to that of the modern fleam. Harpoons in the Kurile islands are made of bone, with a deep groove along each side; in these grooves thin and sharp flat flakes are fastened with gum.[2] According to Evans, similar flakes were used for scraping,[3] just as broken glass is used among mod-

[1] Indian Tribes, vol. I, p. 253.
[2] Nilsson; Stone Age, p. 46.
[3] Stone Implements, p. 256.

ern woodworkers. Flakes have been found in the Swiss lakes in wooden handles in the fashion of Eskimo knives; also in Australia with skin wrapped around one end to protect the hand.[1]

All the flakes in the Bureau collection are small, few of them being over three inches long. They are found elsewhere with a length of over a foot; but the nature of the flint occurring in the United States is seldom such as to allow flakes to be struck off equaling in size those found in Europe.

Evans says that blows with a pebble will form just such flakes as those produced by an iron hammer; the blows must, however, be delivered in exactly the right spot and with the proper force. Cores sometimes show markings of hammers when struck too near the edge. Flakes can be produced by using a pebble as a set or punch and striking it with a stone. The use of a set was probably the exception rather than the rule, for great precision may be obtained simply with a hammer held in the hand. The Eskimo use a hammer set in a handle to strike off flakes, or strike them off by slight taps with a hammer of jade, oval in shape, about 2 by 3 inches, and secured to a bone handle with sinew.[2]

According to Tylor, the Peruvian Indians work obsidian by laying a bone wedge on the surface of a piece and tapping it until the stone cracks;[3] while the Indians of Mexico hold a piece of obsidian 6 or 8 inches long between their feet, then holding the crosspiece of a T-shape stick against the breast they place the other end against the stone and force off a piece by pressure.[4]

Nilsson says that the Eskimo set a point of deer horn into a handle of ivory and drive off splinters from the chert,[5] and Redding saw a Cloud river Indian make flakes thus: Holding a piece of obsidian in his hand, he placed the straight edge of a piece of split deer horn, four inches long and half an inch in diameter, at a distance from the edge of the stone equal to the thickness of the arrow he wished to make; then striking the other end with a stone he drove off a flake.[6] Schumacher observed that the Klamath Indians heat a stone and break it into fragments at a single blow.[7]

According to Stevens the Shasta Indian lays a stone anvil on his knee, and holding on the anvil the stone which he is working,[8] strikes off a flake one-fourth of an inch thick with a stone hammer; but Powers says the Shasta Indians heat a stone and allow it to cool slowly, which splits it into flakes,[9] and Bancroft that they place an obsidian pebble

[1] Stone Implements, p. 263.
[2] Ibid., pp. 20, 23, and 35.
[3] Anahuac, p. 99.
[4] Ibid, pp. 231. 232 (note).
[5] Stone Age, p. 261 (note).
[6] Amer. Naturalist, vol. XIII, p. 665.
[7] Hayden Survey, Bul. 3, 1877, p. 547.
[8] Flint Chips, p. 77.
[9] Contributions to N. A. Eth., vol. III, p. 104.

on an anvil of stone and split it with an agate chisel to the required size.[1] The Shoshoni or Snake Indians of the northwest work in the same way,[2] and certain California Indians strike off flakes from a mass of agate, jasper, or chalcedony with a stone hammer,[3] while the Apache break a bowlder of hornstone with a heavy stone hammer having a twisted withe for a handle.[4]

Schoolcraft says experience has taught the Indians that some varieties of hornstone (flint) are less easily fractured than others, and that the conchoidal form is found best in softer varieties; also that weathered fragments are managed with greater difficulty than are those freshly quarried.[5]

Evans points out that in making gunflints much depends upon the condition of the stone as regards the moisture it contains, those that have been too long exposed on the surface becoming intractable, and there is also a difficulty in working those that are too moist. Some of the workers, however, say that a flint which has been some time exposed to the air is harder than one recently dug, yet it works equally well.[6]

It is related that in former times white hunters in Ohio and Kentucky, when they needed a gunflint, would select a fragment from the surface, where practicable, and soak it in oil for several weeks "to make it tough;" otherwise it would shatter to fragments when struck.

FIG. 263.—Flake, chipped for scraper.

Frequently the large flat spalls knocked from blocks or chunks of flint in shaping them, or in obtaining pieces to work, are of such form that very little additional labor converts them into serviceable scrapers, knives, spears, or arrows. A number of such pieces are found in the collection. These, however, are not considered in the flakes now to be described:

A. Edges bluntly chipped (from the concave side) for use as scrapers. They may or may not have notches for attachment to a handle. An example from Kanawha valley, West Virginia, is shown in figure 263. Others come from southwestern Arkansas; Kanawha valley; Miami and Scioto valleys, and central Ohio.

B. Trimmed only enough to give a general leaf shape, the faces being left unchanged; for use as knives or arrowheads, most of them being exceedingly small; notched, or with continuous edges. This form is

[1] Native Races, vol. I, p. 342.
[2] Schoolcraft; Indian Tribes, vol. I, p. 212.
[3] Stevens; Flint Chips, p. 78 (from Powers).
[4] Catlin; Last Rambles Among the Indians, p. 187.
[5] Indian Tribes, vol. III, p. 467.
[6] Stone Implements, p. 17.

represented by the specimen from Licking county, Ohio, illustrated in figure 264. It is found in central Ohio; northeastern Arkansas; Coosa valley, Alabama; eastern Tennessee; and western North Carolina.

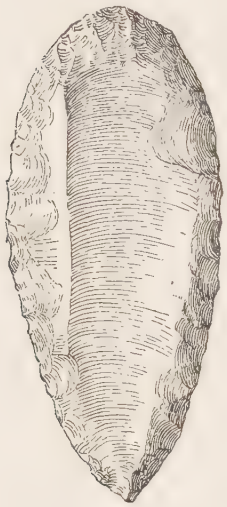


FIG. 264.—Flake, chipped for knife or arrow head.

C. Long, slender, with three or four facets on one face, caused by others having been struck off above. The edges are as keen as broken glass, and the points are usually quite sharp. In a great many the points have been worked off by fine, secondary chipping. When this is done, it is always at the end which was struck in knocking off the flake. In some cases it may be due to the shattering effects of the blow; but in many specimens the evidence is plain that it was done afterward for the purpose of making a sharper point. Some flakes of this kind have notches for attachment to a shaft, probably for arrows; such specimens, however, are without the secondary chipping, and the notches are at the end opposite the one struck.

FIG. 265.—Flake, slender, probably for lancet.

A good example, shown in figure 265, is from Kanawha valley, and there are others from the same locality, as well as from Miami valley, Ohio; and Union county, Mississippi.

FIG. 266.—Stemmed chipped flint.

MISCELLANEOUS FORMS.

From the Savannah collection there are several forms of chipped flints which, while resembling the foregoing in various ways, present characters which make it necessary to place them by themselves; and while containing a majority of the types described above, this collection has many that have no counterpart from any other section visited by the Bureau collectors. Some of these unique specimens of aboriginal art are among the following:

A. Edges double curved, expanding to a wide point at the shoulder; stem straight or tapering; base either straight or slightly convex. The type of the group is quite well represented in figure 266.

B. Edges concave; base and stem straight; very wide projections or wings at the shoulders, going in by straight or curved lines to the stem (illustrated in figure 267).

C. Edges concave, changing to convex at the shoulders, and curving around to the stem, which is straight or slightly expanding; base straight or very slightly convex (figure 268).

D. Convex edges, widening into greatly expanding barbs; base straight; stem expanding by straight lines (figure 269).

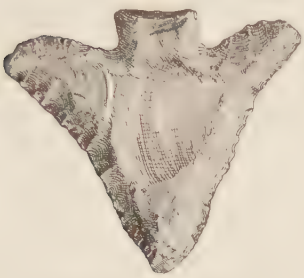


FIG. 267.—Stemmed chipped flint, winged

FIG. 268.—Stemmed chipped flint.

E. Broad; double-curved edges; notched in from the base, and barbs worked so as to be narrowest near the blade, with the ends straight or round; stem expanding by straight lines; base straight (figure 270).

F. Edges nearly straight to the barbs, which are worked off to a point toward the stem; base convex and wide; stem expanding by curved lines (figure 271).

FIG. 269.—Stemmed chipped flint, barbed

FIG. 270.—Stemmed chipped flint, broad

G. Rather slender; base nearly straight, either convex or concave; stem rapidly expanding; notched in from the corners, making long slender barbs which project beyond the line of the edges (as illustrated

in figure 272). The same form comes from Dougherty county, southwestern Georgia, as well as from Savannah.

H. Straight or convex edges; base straight or slightly convex; stem to one side of the center, leaving one barb longer and larger than the other (figure 273).

I. Triangular, notched in from the bottom; barbs extend down even with the base, or the base is sometimes worked back, leaving it shorter than the barbs; some are beveled (figure 274). The same form is found in southwestern Georgia.

J. Broad; straight edges; base straight or concave; stem straight or expanding; long, rounded barbs (figure 275).

FIG. 272.—Stemmed chipped flint, slender.

FIG. 271.—Stemmed chipped flint.

K. From Arkansas county, Arkansas, there is an implement of basanite or black jasper, of the general type of figure 180 or 182, the point being broken off. The base has been worked down to a sharp edge, the stem highly polished on both faces. This polish does not extend to the faces of the blade, but both edges are rubbed smooth so far as they now extend. Whether the implement was originally pointed and used as a knife or spear, this sharp edge being given the stem after it was broken, or whether it was so made in the first place, can not be determined. Like the various forms with polished base, the specimen seems to indicate a manner of mounting or of use the reverse of what would be expected. It is shown in figure 276.

FIG. 273.—Stemmed chipped flint.

FIG. 274.—Stemmed chipped flint, triangular.

FIG. 275.—Stemmed chipped flint.

Figure 277 shows an implement from Licking county, Ohio, somewhat of the form of figure 205, except that it is wider and much thinner. It is worn smooth on each edge for $\frac{3}{4}$ inch from the point, the point itself being quite blunt. This probably results from use as a knife or drill; though, if due to the latter cause, the material on which

it was used must have been quite soft or thin. Similar wear is seen on implements from the same locality of the form of figures 176 and 223, but this article is smaller than those represented by the figures.

In figure 278 is shown a small knife of the pattern so common in

FIG. 276.—Chipped flint, with sharp-edged stem.

FIG. 277.—Stemmed chipped flint, point blunted from use.

specimens mounted in antlers, from the Swiss lake dwellings. In outline it resembles the arrowheads having straight edges and a convex base; but the side view shows the purpose for which it was made. Similar pieces are found throughout central Ohio, and along Ohio river from the Kanawha to the Miami.

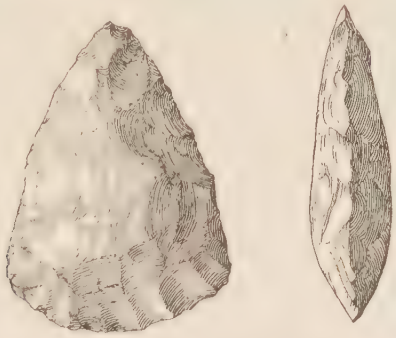


FIG. 278.—Stemmed chipped flint.

NOTES ON BEVELED FLINTS.

In the beveled flints the side-chipping producing the bevel is always to the left, as may be seen in figure 235; only one exception to this has been found. It has been supposed that this is done to give a rotary motion to an arrow. Morgan[1] says that "arrowheads are occasionally found with a twist to make the arrow revolve in its flight;" and

[1] League of the Iroquois, p. 358.

the same statement has often been made by others. It may be objected, however, that very few of these beveled specimens are small enough for arrowheads; and modern archers have shown that the shape does not affect the flight of the arrow.

Schoolcraft,[1] Powers,[2] Morgan,[3] and Cheever[4] say that the modern Indians sometimes have a spiral arrangement of the feathers on their arrow to produce a rotary motion or "rifling." This rotary motion is supposed to keep the arrow in a straight course, as without it a deviation from the direct line would tend constantly to increase. But as showing that the rotary motion is not always desired, Dodge says that sometimes the blade, in regard to the string notch, is set so as to be perpendicular, to go in between the ribs of game; again, so as to be horizontal, to go in between the ribs of an enemy.[5]

The beveled flints were probably used for skinning game, as they are better fitted for this than for anything else, and would serve such purpose better than almost any other form of the smaller chipped flints. The bevel is such as would be necessary if the implement were held in the right hand and pulled toward the user.

There are a great many specimens in the collection, both in the ground or pecked and in the chipped implements, which can not be classified with any of the objects herein described; but they are to be considered as due rather to individual whims than as representative of a type.

[1] Indian Tribes, vol. I, p. 213.
[2] Cont. to N. A. Eth., vol. III, p. 52.
[3] League of the Iroquois, pp. 306, 308.
[4] Amer. Nat., vol. IV, p. 140.
[5] Our Wild Indians, p. 418.

ABORIGINAL REMAINS

IN

VERDE VALLEY, ARIZONA

BY

COSMOS MINDELEFF

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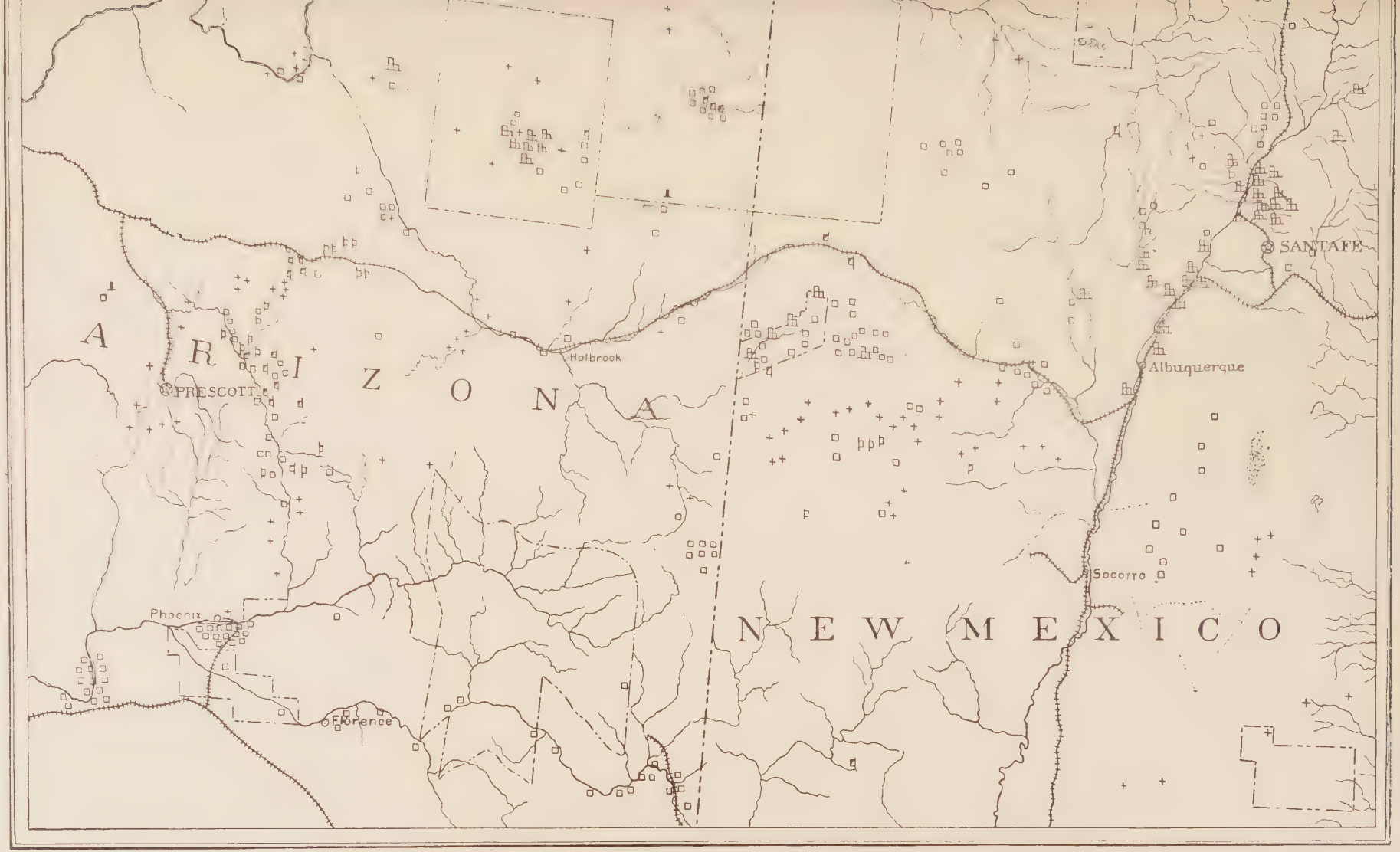
SALT LAKE CITY
U T A H
COLORADO
St George
Durango



□ VILLAGE RUINS ⊞ INHABITED VILLAGE ◁ CLIFF RUINS ⊐ CAVATE LODGES ⊥ TOWERS + RUINS variety undetermined

MAP SHOWING DISTRIBUTION OF RUINS AND LOCATION OF AREA TREATED WITH REFERENCE TO ANCIENT PUEBLO REGION.

ABORIGINAL REMAINS IN VERDE VALLEY, ARIZONA

By Cosmos Mindeleff

INTRODUCTION.

THE REGION AND ITS LITERATURE.

The region described in the following pages comprises the valley of the Rio Verde, in Arizona, from Verde, in eastern central Yavapai county, to the confluence with Salt river, in Maricopa county.

The written history of the region treated extends back only a few years. Since the aboriginal inhabitants abandoned it, or were driven from it, the hostile Apache and Walapai roamed over it without hindrance or opposition, and so late as twenty-five years ago, when the modern settlement of the region commenced, ordinary pursuits were almost impossible. Some of the pioneer settlers are still in possession, and are occupying the ground they took up at the time when the rifle was more necessary for successful agriculture than the plow.

The first notice of this region is derived from the report of Espejo, who visited some "mines" north and east of the present site of Prescott early in 1583; in 1598 Farfan and Quesada of Oñate's expedition visited probably the same locality from Tusayan, and in 1604 Oñate crossed the country a little way north of the present Prescott, in one of his journeys in search of mineral wealth. Nothing seems to have come of these expeditions, however, and the remoteness of the region from the highways of travel and its rough and forbidding character caused it to remain unknown for over two centuries. It was not until the active prospecting for gold and silver accompanying the American invasion and conquest began that the country again became known. Valuable mines were discovered east and south of the site of Prescott, some of them as early as 1836; but it was not until after 1860 that any considerable amount of work was done, and the mining development of this region, now one of the best known in Arizona, may be said to date from about 1865. Camp Verde was first established in 1861, at a point on the northern side of Beaver creek, but was not regularly occupied until 1866. In 1871 it was removed to its present location, about a mile south of the previous site. It was abandoned as a military post in 1891, and gradually lost the military element of the name.

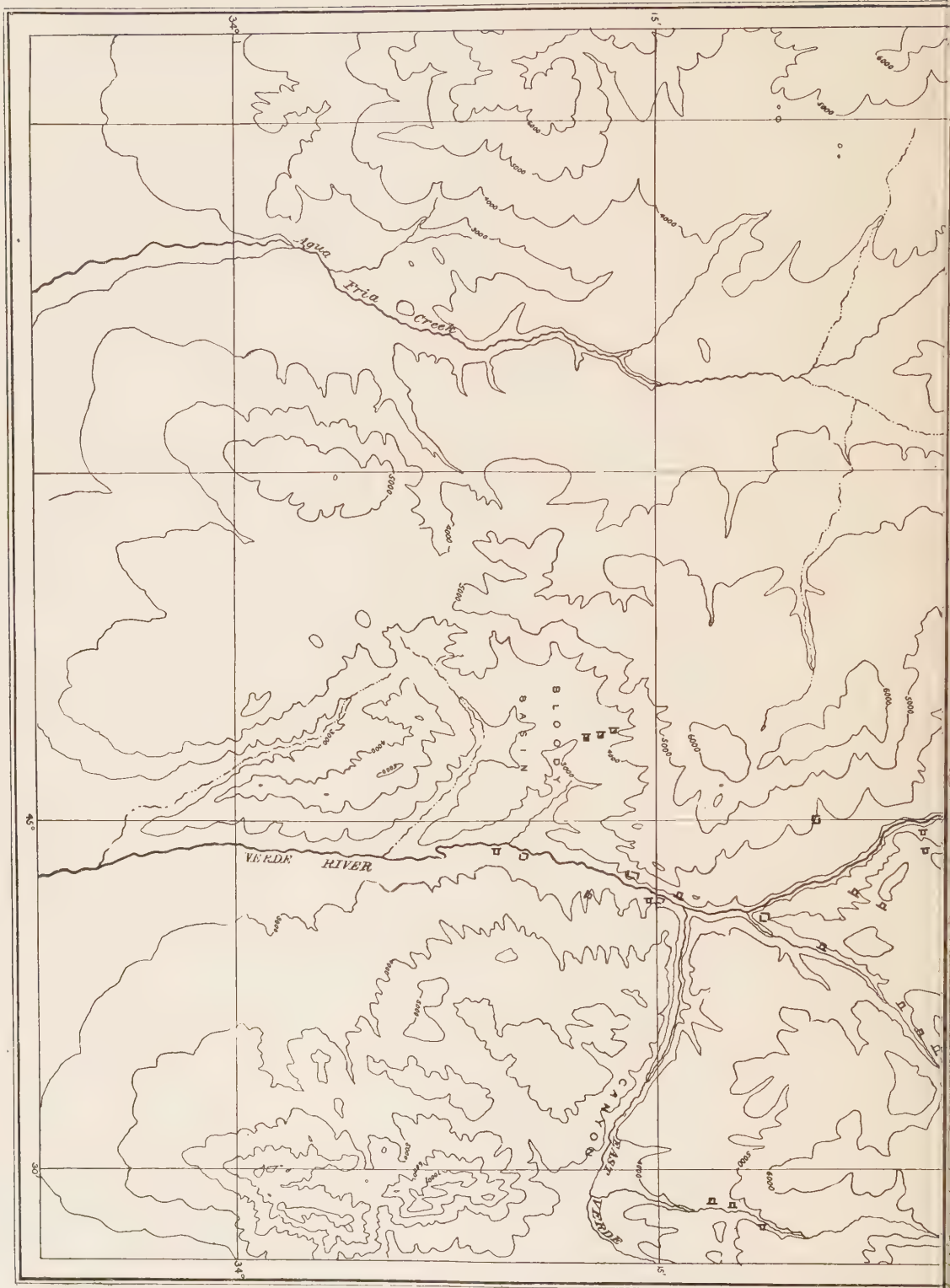
Concerning the archeologic remains of the Rio Verde valley almost nothing is known. In the early history of Arizona the Verde was known as Rio San Francisco, and vague rumors of large and important ruins were current among trappers and prospectors. The Pacific railway reports, published in 1856, mention these ruins on the authority of the guide to Lieut. Whipple's party, Leroux by name. Other notices are found here and there in various books of exploration and travel published during the next two decades, but no systematic examination of the region was made and the accounts are hardly more than a mention. In 1878 Dr. W. J. Hoffman, at that time connected with the Hayden Survey, published descriptions of the so-called Montezuma well and of a large cliff ruin on Beaver creek, the latter accompanied by an illustration.[1] The descriptions are slight and do not touch the region herein discussed.

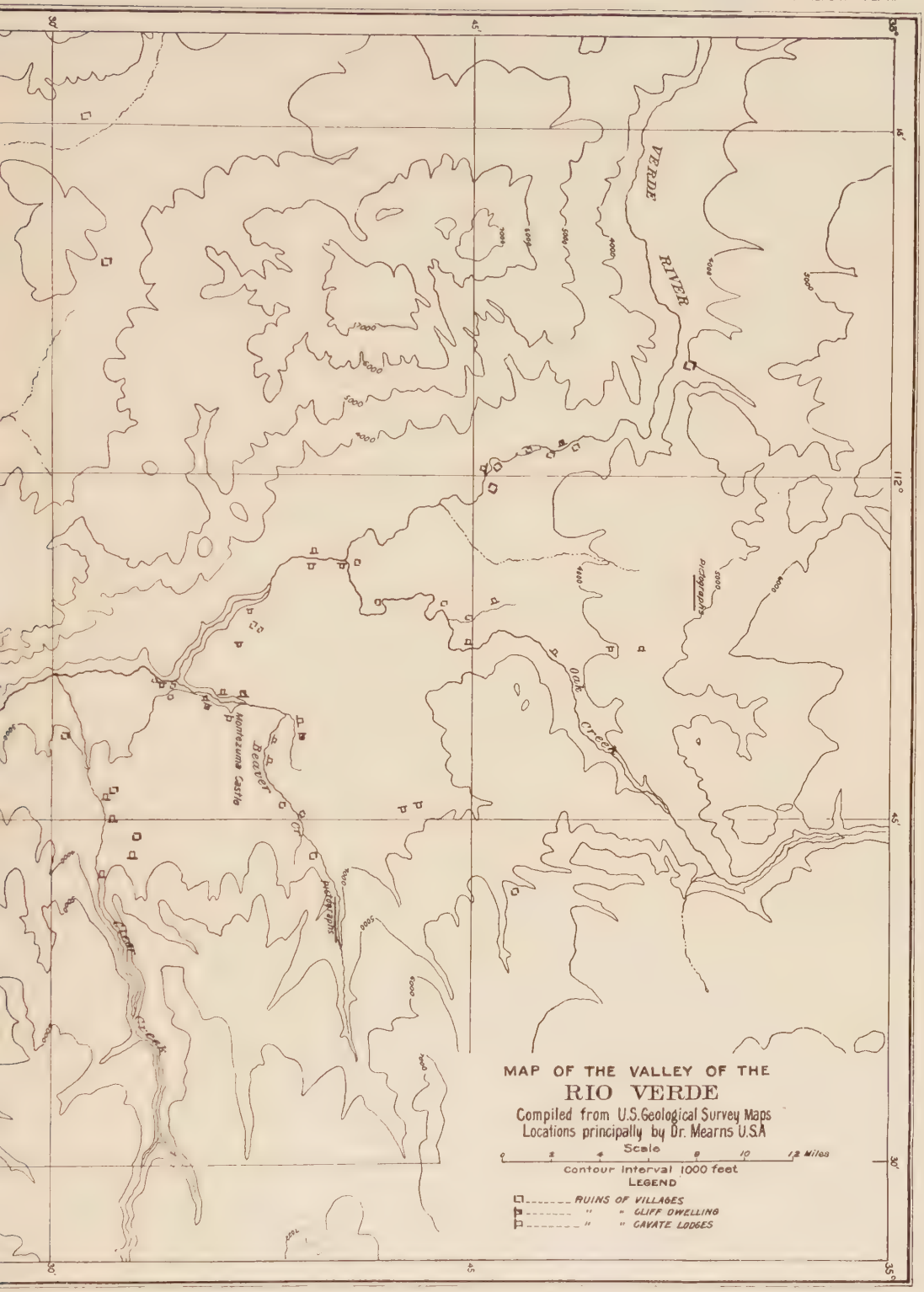
The first publication of importance to the present inquiry is a short paper by Dr. E. A. Mearns, U. S. Army, in the Popular Science Monthly for October, 1890. Dr. Mearns was stationed for some years at Camp Verde, and improved the opportunity afforded by numerous hunting expeditions and tours of duty to acquaint himself with the aboriginal remains of the Verde valley. He published a map showing the distribution of remains in that region, described several ruins in detail, and illustrated some pieces of pottery, etc., found by him. The article is unfortunately very short, so short that it is hardly more than an introduction to the wide field it covers; it is to be hoped that Dr. Mearns will utilize the material he has and publish a more comprehensive report.

The remains in the valley of Rio Verde derive an additional interest from their position in the ancient pueblo region. On the one hand they are near the southwestern limit of that region, and on the other hand they occupy an intermediate position between the ruins of the Gila and Salt river valleys and those of the northern districts. The limits of the ancient pueblo region have not yet been defined, and the accompanying map (plate x) is only preliminary. It illustrates the limited extent of our knowledge of the ancient pueblo region as well as the distribution of ruins within that region, so far as they are known; and the exceptional abundance of ruins noted on certain portions of the map means only that those parts are better known than others. Notwithstanding its incompleteness, it is the best available and is published in the hope that it will serve as a nucleus to which further data may be added until a complete map is produced.

The ruins in the Gila valley, including those along Salt river, are less known than those farther northward, but we know that there is a marked difference between the type exemplified by the well-known Casa Grande, near Florence, Arizona, and that of which the best specimens (notably the Chaco ruins) are found in the San Juan basin. This

[1] Tenth Ann. Rep. U. S. Geol. Survey for 1876 (Washington, 1878), p. 477.


Agua Fria Creek
BLOODY BASIN
VERDE RIVER
CANYON
EAST VERDE
34°
15'
45°
30'


MAP OF THE VALLEY OF THE
RIO VERDE
Compiled from U.S. Geological Survey Maps
Locations principally by Dr. Mearns U.S.A
Scale
0 2 4 8 10 12 Miles
Contour Interval 1000 feet
LEGEND
RUINS OF VILLAGES
" " CLIFF DWELLING
" " CAVATE LODGES
VERDE RIVER
Oak Creek
Beaver Cr
Montezuma Castle
Pictographs
Clear Creek
112°
45'
30'
35°

difference may be due only to a different environment, necessitating a change in material employed and consequent on this a change in methods, although it seems to the writer that the difference is perhaps too great to be accounted for in this way. Be the cause what it may, there is no doubt that there is a difference; and it is reasonable to expect that in the regions lying between the southern earth-constructed and the northern stone structures, intermediate types might be found which would connect them. The valley of Rio Verde occupies such an intermediate position geographically, but the architectural remains found in it belong to the northern type; so we must look elsewhere for connecting links. The most important ruin in the lower Verde region occurs near its southern end, and more distinctly resembles the northern ruins than the ruins in the northern part of that region.

Although the examination of this region failed to connect the northern and southern types of house structure, the peculiar conditions here are exceptionally valuable to the study of the principles and methods of pueblo building. Here remains of large villages with elaborate and complex ground plan, indicating a long period of occupancy, are found, and within a short distance there are ruins of small villages with very simple ground plan, both produced under the same environment; and comparative study of the two may indicate some of the principles which govern the growth of villages and whose result can be seen in the ground plans. Here also there is an exceptional development of cavate lodges, and corresponding to this development an almost entire absence of cliff dwellings. From the large amount of data here a fairly complete idea of this phase of pueblo life may be obtained. This region is not equal to the Gila valley in data for the study of horticultural methods practiced among the ancient Pueblos, but there is enough to show that the inhabitants relied principally and, perhaps, exclusively on horticulture for means of subsistence, and that their knowledge of horticultural methods was almost, if not quite, equal to that of their southern neighbors. The environment here was not nearly so favorable to that method of life as farther southward, not even so favorable as in some northern districts, and in consequence more primitive appliances and ruder methods prevailed. Added to these advantages for study there is the further one that nowhere within this region are there any traces of other than purely aboriginal work; no adobe walls, no chimneys, no constructive expedients other than those which may be reasonably set down as aboriginal; and, finally, the region is still so little occupied by modern settlers that, with the exception of the vicinity of Verde, the remains have been practically undisturbed. A complete picture of aboriginal life during the occupancy of the lower Verde valley would be a picture of pueblo life pursued in the face of great difficulties, and with an environment so unfavorable that had the occupation extended over an indefinite period of time it would still have been impossible to develop the great structures which resulted from the settlements in Chaco canyon.

It is not known what particular branch of the pueblo-building tribes formerly made their home in the lower Verde valley, but the character of the masonry, the rough methods employed, and the character of the remains suggest the Tusayan. It has been already stated that the archeologic affinities of this region are northern and do not conform to any type now found in the south; and it is known that some of the Tusayan gentes—the water people—came from the south. The following tradition, which, though not very definite, is of interest in this connection, was obtained by the late A. M. Stephen, for many years a resident near the Tusayan villages in Arizona, who, aside from his competence for that work, had every facility for obtaining data of this kind. The tradition was dictated by Anawita, chief of the Pat-ki-nyûmû (Water house gentes) and is as follows:

We did not come direct to this region (Tusayan)—we had no fixed intention as to where we should go.

We are the Pat-ki-nyû-mû, and we dwelt in the Pa-lát-kwa-bĭ (Red Land) where the kwá-ni (agave) grows high and plentiful; perhaps it was in the region the Americans call Gila valley, but of that I am not certain. It was far south of here, and a large river flowed past our village, which was large, and the houses were high, and a strange thing happened there.

Our people were not living peaceably at that time; we were quarreling among ourselves, over huts and other things I have heard, but who can tell what caused their quarrels? There was a famous hunter of our people, and he cut off the tips from the antlers of the deer which he killed and [wore them for a necklace?] he always carried them. He lay down in a hollow in the court of the village, as if he had died, but our people doubted this; they thought he was only shamming death, yet they covered him up with earth. Next day his extended hand protruded, the four fingers erect, and the first day after that one finger disappeared [was doubled up?]; each day a finger disappeared, until on the fourth day his hand was no longer visible.

The old people thought that he dug down to the under world with the horn tips.

On the fifth day water spouted up from the hole where his hand had been and it spread over everywhere. On the sixth day Pá-lü-lü-koña (the Serpent deity) protruded from this hole and lifted his head high above the water and looked around in every direction. All of the lower land was covered and many were drowned, but most of our people had fled to some knolls not far from the village and which were not yet submerged.

When the old men saw Pá-lü-lü-koña they asked him what he wanted, because they knew he had caused this flood; and Pá-lü-lü-koña said, "I want you to give me a youth and a maiden."

The elders consulted, and then selected the handsomest youth and fairest maid and arrayed them in their finest apparel, the youth with a white kilt and paroquet plume, and the maid with a fine blue tunic and white mantle. These children wept and besought their parents not to send them to Pá-lü-lü-koña, but an old chief said, "You must go; do not be afraid; I will guide you." And he led them toward the village court and stood at the edge of the water, but sent the children wading in toward Pá-lü-lü-koña, and when they reached the center of the court where Pá-lü-lü-koña was the deity and the children disappeared. The water then rushed down after them, through a great cavity, and the earth quaked and many houses tumbled down, and from this cavity a great mound of dark rock protruded. This rock mound was glossy and of all colors; it was beautiful, and, as I have been told, it still remains there.

GROUND PLAN OF
RUIN
NEAR MOUTH OF LIMESTONE CREEK
RIO VERDE
ARIZONA
Scale of Feet.
0
80
160
Contour Interval 2½ ft.

The White Mountain Apache have told me that they know a place in the south where old houses surround a great rock, and the land in the vicinity is wet and boggy.

We traveled northward from Palat-kwabi and continued to travel just as long as any strength was left in the people—as long as they had breath. During these journeys we would halt only for one day at a time. Then our chief planted corn in the morning and the pá-to-la-tci (dragon fly) came and hovered over the stalks and by noon the corn was ripe; before sunset it was quite dry and the stalks fell over, and whichever way they pointed in that direction we traveled.

When anyone became ill, or when children fretted and cried, or the young people became homesick, the Co-i-yal Katcina (a youth and a maiden) came and danced before them; then the sick got well, children laughed, and sad ones became cheerful.

We would continue to travel until everyone was thoroughly worn out, then we would halt and build houses and plant, remaining perhaps many years.

One of these places where we lived is not far from San Carlos, in a valley, and another is on a mesa near a spring called Coyote Water by the Apache. * * *

When we came to the valley of the Little Colorado, south of where Winslow now is, we built houses and lived there; and then we crossed to the northern side of the valley and built houses at Homolobi. This was a good place for a time, but a plague of flies came and bit the suckling children, causing many of them to die, so we left there and traveled to Ci-pa (near Kuma spring).

Finally we found the Hopi, some going to each of the villages except Awatobi; none went there.

PHYSICAL DESCRIPTION OF THE COUNTRY.

The Rio Verde is throughout its length a mountain stream. Rising in the mountains and plateaus bounding two great connected valleys northwest of Prescott, known as Big Chino valley and Williamson valley, both over 4,000 feet above the sea, it discharges into Salt river about 10 miles south of McDowell and about 25 miles east of Phœnix, at an elevation of less than 1,800 feet above the sea. The fall from Verde to McDowell, a distance of about 65 miles, is about 1,500 feet. The whole course of the river is but little over 150 miles. The small streams which form the river unite on the eastern side of Big Chino valley and flow thence in a southerly and easterly direction until some 12 miles north of Verde the waterway approaches the edge of the volcanic formation known on the maps as the Colorado plateau, or Black mesa, and locally as "the rim." Here the river is sharply deflected southward, and flows thence in a direction almost due south to its mouth. This part of the river is hemmed in on both sides by high mountain chains and broken every few hundred yards by rapids and "riffles."

Its rapid fall would make the river valuable for irrigation if there were tillable land to irrigate; but on the west the river is hugged closely by a mountain chain whose crest, rising over 6,000 feet above the sea, is sometimes less than 2 miles from the river, and whose steep and rugged sides descend in an almost unbroken slope to the river bottom. The eastern side of the river is also closely confined, though

not so closely as the western, by a chain of mountains known as the Mazatzal range. The crest of this chain is generally over 10 miles from the river, and the intervening stretch, unlike the other side, which comes down to the river in practically a single slope, is broken into long promontories and foothills, and sometimes, where the larger tributaries come in, into well-defined terraces. Except at its head the principal tributaries of the Verde come from the east, those on the west, which are almost as numerous, being generally small and insignificant.

Most of the modern settlements of the Rio Verde are along the upper portion of its course. Prescott is situated on Granite creek, one of the sources of the river, and along other tributaries, as far down as the southern end of the great valley in whose center Verde is located, there are many scattered settlements; but from that point to McDowell there are hardly a dozen houses all told. This region is most rugged and forbidding. There are no roads and few trails, and the latter are feebly marked and little used. The few permanent inhabitants of the region are mostly "cow men," and the settlements, except at one point, are shanties known as "cow camps." There are hundreds of square miles of territory here which are never visited by white men, except by "cow-boys" during the spring and autumn round-ups.

Scattered at irregular intervals along both sides of the river are many benches and terraces of alluvium, varying in width from a few feet to several miles, and comprising all the cultivable land in the valley of the river. Since the Verde is a mountain stream with a great fall, its power of erosion is very great, and its channel changes frequently; in some places several times in a single winter season. Benches and terraces are often formed or cut away within a few days, and no portion of the river banks is free from these changes until continued erosion has lowered the bed to such a degree that that portion is beyond the reach of high water. When this occurs the bench or terrace, being formed of rich alluvium, soon becomes covered with grass, and later with mesquite and "cat-claw" bushes, interspersed with such cottonwood trees as may have survived the period when the terrace was but little above the river level. Cottonwoods, with an occasional willow, form the arborescent growth of the valley of the Verde proper, although on some of the principal tributaries and at a little distance from the river groves of other kinds of trees are found. All these trees, however, are confined to the immediate vicinity of the river and those of its tributaries which carry water during most of the year; and as the mountains which hem in the valley on the east and west are not high enough to support great pines such as characterize the plateau country on the north and east, the aspect of the country, even a short distance away from the river bottom, is arid and forbidding in the extreme.

Within the last few years the character of the river and of the country adjacent to it has materially changed, and inferences drawn from

MAIN COURT, RUIN NEAR LIMESTONE CREEK.

present conditions may be erroneous. This change is the direct result of the recent stocking of the country with cattle. More cattle have been brought into the country than in its natural state it will support. One of the results of this overstocking is a very high death rate among the cattle; another and more important result is that the grasses and other vegetation have no chance to seed or mature, being cropped off close to the ground almost as soon as they appear. As a result of this, many of the river terraces and little valleys among the foothills, once celebrated for luxuriant grass, are now bare, and would hardly afford sustenance to a single cow for a week. In place of strong grasses these places are now covered for a few weeks in spring with a growth of a plant known as "filaree," which, owing to the rapid maturing of its seeds (in a month or less), seems to be the only plant not completely destroyed by the cattle, although the latter are very fond of it and eat it freely, both green and when dried on the ground. As a further effect of the abundance of cattle and the scarcity of food for them, the young willows, which, even so late as ten years ago, formed one of the characteristic features of the river and its banks, growing thickly in the bed of the stream, and often forming impenetrable jungles on its banks, are now rarely seen.

Owing to the character of the country it drains, the Rio Verde always must have been subject to freshets and overflows at the time of the spring rains, but until quite recently the obstructions to the rapid collection of water offered by thickly growing grass and bushes prevented destructive floods, except, perhaps, on exceptional occasions. Now, however, the flood of each year is more disastrous than that of the preceding year, and in the flood of February, 1891, the culminating point of intensity and destructiveness was reached. On this occasion the water rose in some places over 20 feet, with a corresponding broadening in other places, and flowed with such velocity that for several weeks it was impossible to cross the river. As a result of these floods, the grassy banks that once distinguished the river are now but little more than a tradition, while the older terraces, which under normal circumstances would now be safe, are being cut away more and more each year. In several localities near Verde, where there are cavate lodges, located originally with especial reference to an adjacent area of tillable land, the terraces have been completely cut away, and the cliffs in which the cavate lodges occur are washed by the river during high water.

DISTRIBUTION AND CLASSIFICATION OF RUINS.

All the modern settlements of the lower portion of the Verde valley are located on terraces or benches, and such localities were also regarded favorably by the ancient builders, for almost invariably where a modern settlement is observed traces of a former one will also be found. The former inhabitants of this region were an agricultural people, and their villages were always located either on or immediately adjacent to some area of tillable soil. This is true even of the cavate lodges, which are often supposed to have been located solely with reference to facility of defense. Owing to the character of the country, most of the tillable land is found on the eastern side of the river, and as a consequence most of the remains of the former inhabitants are found there also, though they are by no means confined to that side. These remains are quite abundant in the vicinity of Verde, and less so between that point and the mouth of the river. The causes which have induced American settlement in the large area of bottom land about Verde doubtless also induced the aboriginal settlement of the same region, although, owing to the different systems of agriculture pursued by the two peoples, the American settlements are always made on the bottom lands themselves, while the aboriginal settlements are almost always located on high ground overlooking the bottoms. Perched on the hills overlooking these bottoms, and sometimes located on the lower levels, there was once a number of large and important villages, while in the regions on the south, where the tillable areas are as a rule very much smaller, the settlements were, with one exception, small and generally insignificant.

The region treated in these pages is that portion of the valley of Rio Verde comprised between its mouth and Verde, or Beaver creek, on the north. It was entered by the writer from the south; it is not proposed, however, to follow a strict geographic order of treatment, but, on the contrary, so far as practicable, to follow an arrangement by types.

The domiciliary ruins of this region fall easily into three general classes, to which may be added a fourth, comprising irrigating ditches and works, the first class having two subclasses. They are as follows:

Stone villages.
- *a*. Villages on bottom lands.
- *b*. Villages on defensive sites.

Cavate lodges.
Bowlder-marked sites.
Irrigating ditches and works.

RUIN AT MOUTH OF THE EAST VERDE.

The ruins of the first group, or stone villages located on bottom lands without reference to defense, represent in size and in degree of skill attained by the builders the highest type in this region, although they are not so numerous as those of the other groups. They are of the same type as, although sometimes smaller in size than, the great valley pueblos of the regions on the north and south, wherein reliance for defense was placed in massive and well-planned structures and not on natural advantages of location. In the north this class of ruin has been shown to be the last stage in a long course of evolution, and there is a suggestion that it occupies the same relation to the other ruins in the Verde region; this question, however, will later be discussed at some length. The best example of this type on the lower Verde is a large ruin, located in a considerable bottom on the eastern side of the river, about a mile above the mouth of Limestone creek. This is said to be the largest ruin on the Verde; it is certainly the largest in the region here treated, and it should be noted that it marks practically the southern limit of the Rio Verde group.

The ruins of the second subclass, or stone villages located on defensive sites, are found throughout the whole of this region, although the type reaches its best development in the northern portion, in the vicinity of Verde. The separation of this type from the preceding one is to a certain extent arbitrary, as the location of a ruin is sometimes determined solely by convenience, and convenience may dictate the selection of a high and defensible site, when the tillable land on which the village depends is of small area, or when it is divided into a number of small and scattered areas; for it was a principle of the ancient village-builders that the parent village should overlook as large an extent as possible of the fields cultivated by its inhabitants. A good illustration of this type of ruin is found a little way northeast of Verde, on the opposite side of the river. Here a cluster of ruins ranging from small groups of domiciles to medium-sized villages is found located on knobs and hills, high up in the foothills and overlooking large areas of the Verde bottom lands. These are illustrated later. Another example, also illustrated later, occurs on the eastern side of the river about 8 miles north of the mouth of Fossil creek. The village, which is very small, occupies the whole summit of a large rock which projects into the stream, and which is connected with the mainland by a natural causeway or dike. This is one of the best sites for defense seen by the writer in an experience of many years.

Cavate lodges are distributed generally over the whole northern portion of the region here treated. At many points throughout this region there are outcrops of a calcareous sandstone, very soft and strongly laminated and therefore easily excavated. This formation often appears in the cliffs and small canyons bordering on the streams, and in it are found the cavate lodges. The best examples are found some 8 miles south of Verde, in a small canyon on the eastern side of the river, and it

is noteworthy that in this case stone villages occur in conjunction with and subordinate to the cavate lodges, while elsewhere within this region and in other regions the cavate lodges are found either alone or in conjunction with and subordinate to stone villages. To this latter type belong a number of cavate lodges on the northern side of Clear creek, about 4 miles above its mouth. The cavate lodges of the Verde differ in some particulars from those found in other regions; they are not excavated in tufa or volcanic ash, nor are the fronts of the chambers generally walled up. Front walls are found here, but they are the exception and not the rule.

Bowlder-marked sites are scattered over the whole region here treated, although they are more abundant in the southern part than in the northern. They are so abundant that their locations could not be indicated on the accompanying map (plate XI). These constitute a peculiar type, not found elsewhere in the experience of the writer, and present some points of interest. They vary in size from one room to considerable settlements, but the average size is two or three rooms. They are always located with reference to some area, generally a small one, of tillable land which they overlook, and all the data now available support the inference that they mark the sites of small farming or temporary shelters, occupied only during the farming season and abandoned each winter by the inhabitants, who then return to the main pueblo—a custom prevalent today among the pueblos. These sites are found on the flat bottom lands of the river, on the upper terraces overlooking the bottoms, on points of the foothills, in fact everywhere where there is an area of tillable land large enough to grow a few hills of corn. They often occur in conjunction with irrigating ditches and other horticultural works; sometimes they are located on small hillocks in the beds of streams, locations which must be covered with water during the annual floods; sometimes they are found at the bases of promontories bordering on drainage channels and on the banks of arroyas, where they might be washed away at any time. In short, these sites seem to have been selected without any thought of their permanency.

Irrigating ditches and horticultural works were found in this region, but not in great abundance; perhaps a more careful and detailed examination would reveal a much larger number than are now known. Fine examples of irrigating ditches were found at the extreme northern and the extreme southern limits of the region here treated, and there is a fair presumption that other examples occur in the intermediate country. These works did not reach the magnitude of those found in the Gila and Salt river valleys, perhaps partly for the reason that the great fall of Verde river and its tributaries renders only short ditches necessary to bring the water out over the terraces, and also partly because irrigation is not here essential to successful horticulture. In good years fair crops can be obtained without irrigation, and today this method of farming is pursued to a limited extent.

MAIN COURT, RUIN AT MOUTH OF THE EAST VERDE.

PLANS AND DESCRIPTIONS.

STONE VILLAGES.

Ruins of villages built of stone, either roughly dressed or merely selected, represent the highest degree of art in architecture attained by the aborigines of Verde valley, and the best example of this class of ruin is found on the eastern side of the river, about a mile above the mouth of Limestone creek. The site was selected without reference to defense, and is overlooked by the hills which circumscribe a large semicircular area of bottom land, on the northern end of which the village was located. This is the largest ruin on the Verde; it covers an area of about 450 feet square, or over 5 acres, and has some 225 rooms on the ground plan. From the amount of débris we may infer that most of the rooms were but one story in height; and a reasonable estimate of the total number of rooms in the village when it was occupied would make the number not greater than 300 rooms. The ratio of rooms to inhabitants in the present pueblos would give a population for this village of about 450 persons. Zuñi, the largest inhabited pueblo, covering an area of about 5 acres, has a population of 1,600.

It will thus be seen that, while the area covered by this village was quite large, the population was comparatively small; in other words, the dense clustering and so-called beehive structure which characterize Zuñi and Taos, and are seen to a less extent in Oraibi, and which result from long-continued pressure of hostile tribes upon a village occupying a site not in itself easily defensible, has not been carried to such an extent here as in the examples cited. But it is also apparent that this village represents the beginning of the process which in time produces a village like Zuñi or Taos.

Plate XII exhibits the ground plan of the village. It will be observed that this plan is remarkably similar in general characters to the ground plan of Zuñi.[1] A close inspection will reveal the presence of many discrepancies in the plan, which suggest that the village received at various times additions to its population in considerable numbers, and was not the result of the gradual growth of one settlement nor the home of a large group coming en masse to this locality. It has been shown[2] that in the old provinces of Tusayan and Cibola (Moki and Zuñi) the present villages are the result of the aggregation of many related gentes and subgentes, who reached their present location at different times and from different directions, and this seems to be the

[1] Eighth Ann. Rep. Bureau of Ethnology, 1886-'87, Wash., 1891, pl. lxxvi.
[2] Ibid., pp. 1-228.

almost universal rule for the larger pueblos and ruins. It should be noted in this connection, however, that, the preceding statements being granted, a general plan of this character indicates an essentially modern origin or foundation.

The ground plan shows a number of courts or open spaces, which divided the village into four well-defined clusters. The largest court was nearly in the center of the village, and within it (as shown on the plan) there are traces of a small single-room structure that may have been a kiva or sacred chamber. Attached to this main court and extending eastward is another court of considerable size, and connected with this second court at its eastern end there is another one almost square in plan and of fair size. West of the main court may be seen a small court opening into it, and north of this another square space separated from the main court by a single stone wall and inclosed on the other three sides by rooms. In addition to these there are two completely inclosed small courts in the center of the southwestern cluster, and another one of moderate size between the southwestern and southern clusters.

The arrangement of these courts is highly suggestive. The central space was evidently the main court of the village at the time of its greatest development, and it is equally evident that it was inclosed at a later period than the small inclosed courts immediately adjacent to it, for had the latter not preceded it they would not occupy the positions they now do. Plate XIII represents a part of the main court, and beyond the débris can be seen a small portion of the bottom upon which the village is built. To the left, in the foreground of the illustration, are traces of a small detached room, perhaps the main kiva[1] of the village; this is also shown on the ground plan, plate XII.

The smaller courts are but little larger than the largest rooms, but it will be noticed that while some of the rooms are quite large they are always oblong. This requirement was dictated by the length of available roofing timbers. The cottonwood groves on the river bank would provide timber of fair size but of very poor quality, and, aside from this, roofing timbers longer than 15 feet could be obtained only at points many miles distant. In either case the hauling of these timbers to the site of the village would be a work of great labor and considerable difficulty. The width of the rooms was, therefore, limited to about 20 feet, most of them being under 15 feet; but this limitation did not apply to the courts, which, though sometimes surrounded on all sides by buildings, were always open to the sky.

It is probable that the central and northern portion of the southwestern cluster comprised the first rooms built in this village. This is the portion which commands the best outlook over the bottom, and it is

[1] The kiva is the assembly chamber, termed estufa in some of the older writings, particularly those of the early Spanish explorers. A full description of these peculiar structures has already been published in an article on Pueblo architecture; Eighth Ann. Rep. Bureau of Ethnology, 1886–'87, Wash., 1891, pp. 1–228.

RUIN AT MOUTH OF FOSSIL CREEK.

also on the highest ground. Following this the southern cluster was probably built; afterwards the northern cluster was added, and finally the northwestern cluster. Subsequently rooms connecting these clusters and the eastern end of the village were built up, and probably last of all were added the rooms which occupied what was originally the eastern end of the main court. This hypothetic order of building the clusters composing the village is supported by the character of the site and the peculiarities of the ground plan. Most of the rooms in the northwestern cluster and in the eastern part of the village were but one story in height, while the crowding in the interior of the village, direct evidence of which is seen on the ground plan, could take place only after the rooms surrounding that area had been located, and when hostile pressure from outside made it undesirable to extend the bounds of the village; in other words, at the latest stage in the growth of the village.

The arrangement and distribution of the rooms within the clusters indicate an occupancy extending over a considerable period of time. A reference to the ground plan will show that continuous wall lines are the exception, and it is seldom that more than two or three rooms are grouped together in regular order. In irregularity of arrangement the inhabitants of this village followed a general habit, the result of which can be seen today in all the inhabited villages and in most of the large pueblo ruins. It indicates a steady growth of the village by the addition of rooms, one or two at a time, as they were needed. The division into clusters, however, indicates an aggregation of related gentes or subgentes banded together for protection. Given these conditions, (1) bands of related families living near one another; (2) hostile pressure from outside; and (3) a site not in itself easily defended, and a ground plan similar to the one under discussion must result. Single detached rooms would not be built when the village might be attacked at any time, but they might be added during periods of peace and, the conditions being favorable, they might form the nuclei of other clusters. It is possible that some of the clusters forming this village had their origin in this manner, but this question can not be determined from the ground plan, as a similar result would be produced by the advent of a small band of related families.

Growth in number of rooms does not necessarily indicate growth in population, and this qualification must not be lost sight of in the discussion of pueblo ground plans. Among the Pueblos of today, descent, in real property at least, is in the female line; when a man marries he becomes a member of his wife's family and leaves his own home to live with his wife's people. If the wife's home is not large enough to contain all the members of the household, additional rooms are built adjoining and connected with those previously occupied. It may be mentioned in this connection that the women build the houses, although the men supply the material and do the heavy work. The result of this custom may be readily seen: a family in which there are many daughters must

necessarily increase the space occupied by it, while a family consisting of sons, no matter how many they may be, will become extinct, so far as regards its home in the village. It is no uncommon thing to see in the villages of today several rooms in course of erection while there are a dozen or more rooms within a few steps abandoned and going to decay. Long occupancy, therefore, produces much the same effect on a ground plan of a village as a large population, or a rapidly growing one, except that in the former case irregularity in the arrangement of rooms will be more pronounced.

It will be noticed that the size of rooms is more varied in the southwestern and southern clusters than in the remaining portions of the village. In the southwestern cluster rooms measuring 8 feet by 18 or 20 are not uncommon. These occur principally in the central and southwestern part of the cluster, while in the northern and northeastern part the rooms are uncommonly large, one of them measuring about 40 feet in length by nearly 15 feet in width and presenting a floor area of 600 square feet. Rooms approaching this size are more common, however, in the northern and northwestern clusters. In these latter clusters long narrow rooms are the exception and a number of almost square ones are seen. The smallest room in the village is in the center of the southern cluster, on the highest ground within the area covered by the ruin; it measures 6 feet by 10, with a floor area of 60 square feet, as opposed to the 600 square feet of the largest room. This small room was probably at one time a small open space between two projecting rooms, such as are often seen in the inhabited pueblos. Later the room on the south was built and the front of the space was walled up in order to make a rectangular area, thus forming the small room shown on the ground plan. The maximum length of any room is about 40 feet, the maximum width attained is about 20 feet, and in a general way it may be stated that the average size of the rooms is considerably larger than that of the rooms in the northern ruins.

From the regularity in distribution of the débris now on the ground, it appears that the rooms of the northwestern and northern clusters, including the eastern part of the village, were almost uniformly one story in height, and most of the rooms in the other clusters were also limited in height to a single story. The only places on the ground plan where rooms of two stories might have existed are the northern and central parts of the southwestern and southern clusters, and perhaps the southern side of the northern cluster; the last, however, being very doubtful.

In the scarcity of detached rooms or small clusters the plan of this village strongly resembles the ground plan of Zuñi. Only three detached rooms are seen in the plan. One of these, situated in the main or central court, has already been referred to as probably the remains of a kiva or sacred chamber. Another single room occurs outside of the village, near its southwestern corner. This was probably a dwelling room, for a kiva would hardly be located in this place.

The third room is found also outside the village and at its southeastern corner. The space inclosed within the walls of this room measured about 7 feet by 4 and the lines of wall are at an acute angle with the wall lines of the village. This structure is anomalous, and its purpose is not clear.

The absence of clearly defined traces of passageways to the interior of the village is noticeable. This absence can hardly be attributed to the advanced state of decay in the ruin, for nearly all the wall lines can still be easily traced. At one point only is there a suggestion of an open passageway similar to those found in the inhabited pueblos. This occurs in the southeastern corner of the ground plan, between the southern cluster and the southern part of the northeastern cluster. It was about 25 feet long and but 6 feet wide in the clear. There were undoubtedly other passageways to the interior courts, but they were probably roofed over and perhaps consisted of rooms abandoned for that purpose. This, however, is anomalous.

There are several other anomalous features in the ground plan, the purposes of which are not clear. Prominent among them is a heavy wall extending about halfway across the southern side of the village and at some distance from it. The total length of this wall is 164 feet; it is 4 feet thick (nearly twice the thickness of the other walls), and is pierced near its center by an opening or gateway 4 feet wide. The nearest rooms of the village on the north are over 40 feet away. This wall is now much broken down, but here and there, as shown on the plan, portions of the original wall lines are left. It is probable that its original height did not exceed 5 or 6 feet. The purpose of this structure is obscure; it could not have been erected for defense, for it has no defensive value whatever; it had no connection with the houses of the village, for it is too far removed from them. The only possible use of this wall that occurs to the writer is that it was a dam or retaining wall for a shallow pool of water, fed by the surface drainage of a small area on the east and northeast. There is at present a very slight depression between the wall and the first houses of the village toward the north—about a foot or a foot and a half—but there may have been a depression of 2 or 3 feet here at one time and this depression may have been subsequently filled up by sediment. This conjecture could be easily tested by excavating a trench across the area between the wall and the houses, but in the absence of such an excavation the suggestion is a mere surmise.

Another anomalous feature is found in the center of the southwestern cluster. Here, in two different rooms, are found walls of double the usual thickness, occurring, however, on only one or two sides of the rooms. These are clearly shown on the ground plan. The westernmost of the two rooms which exhibit this feature has walls of normal thickness on three of its sides, while the fourth or eastern side consists of two walls of normal thickness, built side by side, perhaps the result of some domestic quarrel. The eastern room, however, has thick walls

on its northern and eastern sides, and in this case the walls are built solidly at one time, not consisting, as in the previous case, of two walls of ordinary thickness built side by side. An inspection of the ground plan will show that in both these cases this feature is anomalous and probably unimportant.

A ruin of the same general type as that just described, but much smaller in size, is found about 6 miles farther northward on the eastern side of the river. It is located on the river edge of a large semicircular flat or terrace, near its northern end, and is built of flat slabs of limestone and river bowlders. It is rectangular in plan and of mod erate size. On the southern end of the same flat are two single-room rancher's houses and a large corral. The rooms in this ruin are oblong and similar in size and arrangement to those just described.

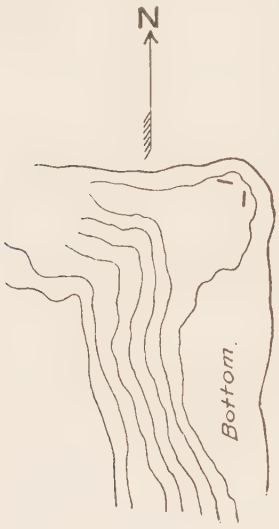


FIG. 279.—Sketch map, site of small ruin 10 miles north of Fossil creek.

About 11 miles above the last-described ruin, or 17 miles above the large ruin near Limestone creek, there is another small ruin of the same general type as the last, located on a similar site, and in all respects, except size, closely similar to it.

About 3 miles below the mouth of the East Verde there is still another ruin of similar character, located on the edge of a mesa or bench overlooking the river. It is built of bowlders and slabs of rock. Like the others this ruin is rectangular in plan and of small size.

About 10 miles north of the mouth of Fossil creek, on the point of a bench or terrace on the western side of the river, and perhaps 20 feet above it, occurs a small ruin, similar in character to the preceding. The river here makes a long turn eastward, then flows south again, and in the angle a small bench or terrace is formed. At this point the mountains rise abruptly from the river on both sides to a height of over a thousand feet. Fig. 279 illustrates the location of this ruin. So far as could be distinguished from the hills opposite, the rooms occur in two broken lines at right angles to each other.

These four small ruins are all closely similar to the large ruin described above in all respects except size, and peculiarities of ground plan attendant on size. The rooms are always rectangular, generally oblong, and arranged without regularity as regards their longer axis. Except the one last described, the ruins consist of compact masses of rooms, without evidences of interior courts, all of very small size, and all located without reference to defense. The last-described ruin differs from the others only in the arrangement of rooms. There is practically no standing wall remaining in any of them, and even now they can be seen for miles from the hills above. When the walls were

GENERAL VIEW OF RUINS OPPOSITE VERDE.

standing they must have been conspicuous landmarks. The masonry of all consists of flat bowlders, selected doubtless from the river bed, or perhaps sometimes quarried from the terraces, which themselves contain large numbers of river bowlders. In general appearance and in plan these ruins resemble the ruin next to be described, situated near the mouth of the East Verde.

On the southern side of the East Verde, half a mile above its mouth, a small creek comes in from the south, probably dry throughout most of the year; and on a promontory or point of land left by this creek a small ruin occurs. It is similar in plan and in character of masonry

FIG. 280.—Ground plan of ruin at mouth of the East Verde.

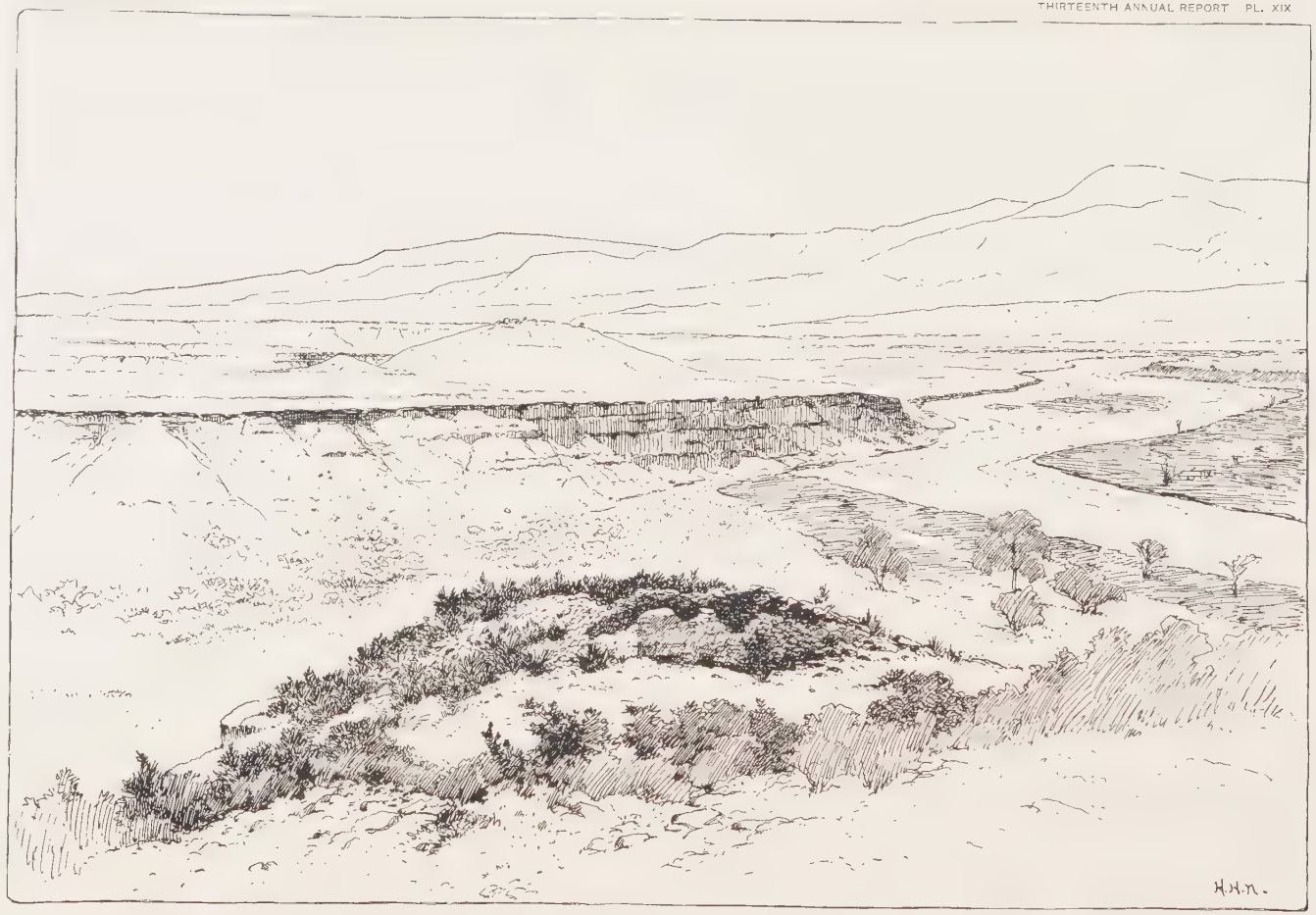
to those just described, and differs from them only in that its site is better adapted for defense, being protected on two sides by steep hills or cliffs. The ground plan of this ruin is shown in figure 280, and its general appearance in plate XIV, which also shows the character of masonry. The village overlooked a large area of low bottom land in the angle between the Verde and the East Verde, and is itself overlooked by the foothills rising behind it to the high mesas forming part of the Mazatzal mountains.

The walls of this village were built of flat bowlders and slabs of limestone, and there is now practically no standing wall remaining. The

ground plan shows a number of places where the walls are still visible, but they extend only a few inches above the débris. There were about forty rooms, and the plan is characterized by irregularities such as have already been noticed in other plans. Although the village was of considerable size it was built up solidly, and there is no trace of an interior court. It will be noticed that the rooms vary much in size, and that many of the smaller rooms are one half the size of the larger ones, as though the larger rooms had been divided by partitions after they were completed. It is probable that rooms extended partly down the slope on the west and south of the village toward the little creek before mentioned, but if this were the case all evidences have long since been obliterated.

On the southern side of the village the ground plan shows a bit of curved wall. It is doubtful whether this was an actual wall or merely a terrace. If it was a wall it is the only example of curved wall found in the region in ruins of this class. Between this wall or terrace and the adjoining wall on the north, with which it was connected, the ground is now filled in. Whether this filling occurred prior or subsequent to the abandonment of the village does not appear. The northeastern corner of the ruin is marked by a somewhat similar feature. Here there is a line of wall now almost obliterated and but feebly marked by débris, and the space between it and the village proper is partly filled in, forming a low terrace. Analogous features are found in several other ruins in this region, notably in the large ruin near Limestone creek. It should be noted in this connection that Mr. E. W. Nelson has found that places somewhat similar to these in the ruins about Springerville, New Mexico, always well repaid the labor of excavation, and he adopted as a working hypothesis the assumption that these were the burial places of the village. Whether a similar condition would be found in this region can only be determined by careful and systematic excavation.

The village did not occupy the whole of the mesa point on which it is located; on the east the ground rises gently to the foothills of the Mazatzal range, and on the south and west it slopes sharply down to the little creek before mentioned; while on the north there is a terrace or flat open space some 60 feet wide and almost parallel with the longer axis of the village. This open space and the sharp fall which limits it on the north is shown on the ground plan. The general view of the same feature (plate XV) also shows the character of the valley of the East Verde above the ruin; the stream is here confined within a low walled canyon. This open space formed a part of the village and doubtless occupied the same relation to it that interior courts do to other villages. Its northern or outer edge is a trifle higher than the space between it and the village proper and is marked by several large bowlders and a small amount of débris. It is possible that at one time there was a defensive wall here, although the ground falls so suddenly that it is almost impossible to climb up to the edge from below without artificial



SOUTHERN PART OF RUINS OPPOSITE VERDE.

aid. Defensive walls such as this may have been are very rare in pueblo architecture, only one instance having been encountered by the writer in an experience of many years. The map seems to show more local relief to this terrace than the general view indicates, but it should be borne in mind that the contour interval is but 2½ feet.

A comparison of the ground plan of this ruin and those previously described, together with that of the ruin near the mouth of Fossil creek (plate XVI), which is typical of this group, shows marked irregularity in outline and plan. In the character of the débris also this ruin differs from the Fossil creek ruin and others located near it. As in the latter, bowlders were used in the wall, but unlike the latter rough stone predominates. In the character of its masonry this ruin forms an intermediate or connecting link between the ruins near Limestone creek and opposite Verde and the class of which the ruin near the mouth of Fossil creek is typical. In the character of its site it is of the same class as the Fossil creek ruin, being intermediate between the valley pueblos, such as that near Limestone creek, and pueblos located on defensive sites, such as the group opposite Verde. The ground plan indicates an occupancy extending over a considerable period of time and terminating at or near the close of the period of aboriginal occupancy of the valley of Rio Verde.

Another ruin, of a type closely similar, occurs on a bluff near the mouth of Fossil creek. The plan of this ruin is shown in figure 281. The village is located close to the edge of the bluff, as shown in the plan, and has an outlook over a considerable area of bottom land adjoining the bluff on the east. It is probable that the cavate lodges whose location some 8 or 10 miles above the ruin, on Fossil creek, is shown on the general map (plate XI) were appendages of this village.

The wall still standing extends but a few inches above the débris, but enough remains to mark the principal wall lines, and these are further emphasized by the lines of débris. The débris here is remarkably clean and stands out prominently from the ground surface, instead of being merged into it as is usually the case. This is shown in the general view of the ruin. There are twenty-five rooms on the ground plan, and there is no evidence that any of these attained a greater height than one story. The population, therefore, could not have been much, if any, in excess of forty, and as the average family of the Pueblos consists of five persons, this would make the number of families which found a home in this village less than ten. Notwithstanding this small population the ground plan of this village shows clearly a somewhat extended period of occupancy and a gradual growth in size. The eastern half of the village, which is located along the edge of the bluff, probably preceded the western in point of time. It will be noticed that while the wall lines are seldom continuous for more than three rooms, yet the rooms themselves are arranged with a certain degree of regularity, in that the longer axes are usually parallel.

The masonry of this village is almost entirely of flat bowlders, obtained probably from the bed of the creek immediately below. The terrace on which the village was built, and in fact all the hills about it are composed of gravel and bowlders, but it would be easier to carry the bowlders up from the stream bed than to quarry them from the hillside, and in the former case there would be a better opportunity for selection. Plate XVI shows the character of the rock employed, and illus-

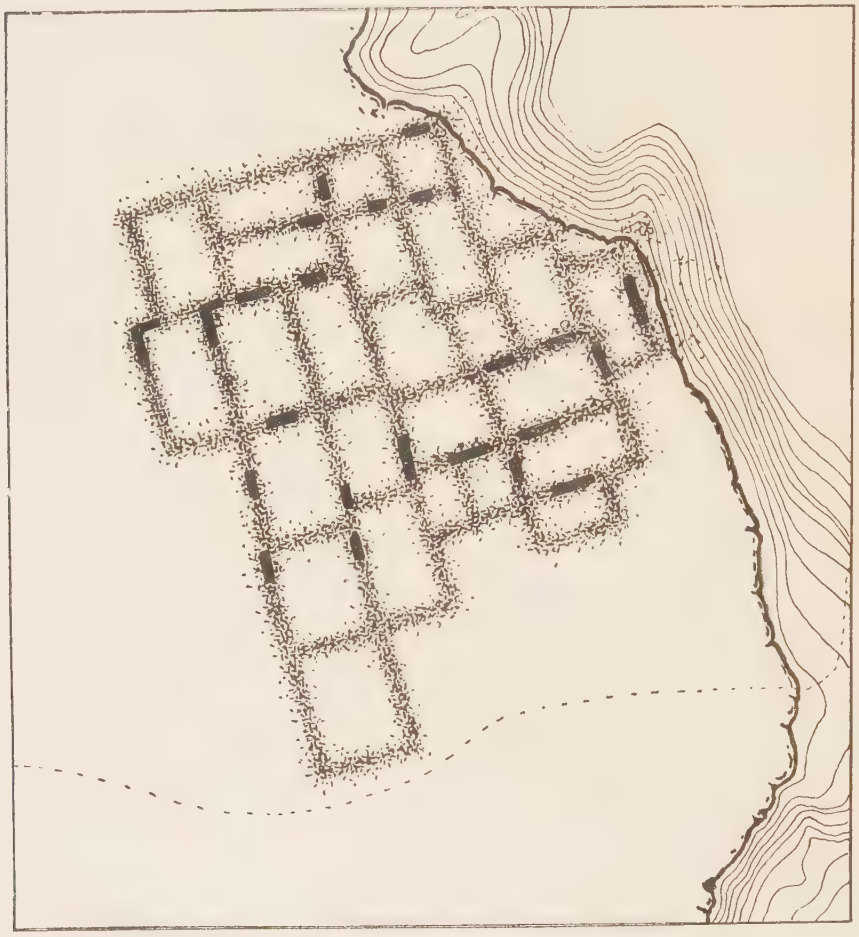


FIG. 281.—Ground plan of ruin near the mouth of Fossil creek.

trates the extent to which selection of rock has been carried. Although the walls are built entirely of river bowlders the masonry presents almost as good a face as some of the ruins previously described as built of slabs of limestone, and this is due to careful selection of the stone employed.

About half a mile above the mouth of Fossil creek, and on the eastern side of the river, a deep ravine comes in from the north and east,

GENERAL VIEW OF RUIN ON SOUTHERN SIDE OF CLEAR CREEK.

and on a low spur near its mouth there is a ruin very similar to the one just described. It is also about the same size. The general character of the site it occupies is shown in the sketch, figure 282. The masonry is of the same general character as that of the ruin near the mouth of Fossil creek, and the débris, which stands out sharply from the ground surface, is distinguished by the same cleanness.

About 8½ miles north of Fossil creek, on the eastern side of the Verde, occurs a small ruin, somewhat different in the arrangement of rooms from those described. Here there is a bench or terrace, some 50 feet above the river, cut through near its northern end by a small canyon. The ruin is located on the southern side of this terrace, near the mouth of the creek, and consists of about ten rooms arranged in L shape. The lines are very irregular, and there are seldom more than three rooms connected. The débris marking the wall lines is clean, and the lines are well defined, although no standing wall remains.

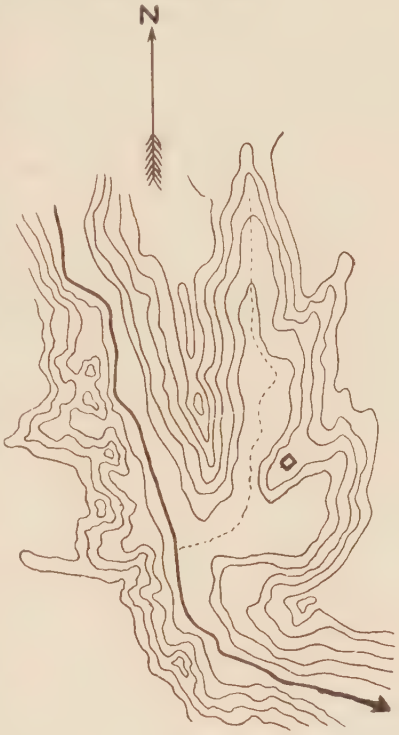


FIG. 282.—Sketch map, site of ruin above Fossil creek.

About a mile above the last-described ruin, or 9½ miles north of the mouth of Fossil creek, a small group of ruins occurs. The sketch, figure 283, shows the relation of the parts of this group to one another. The small cluster of rooms on the south is very similar in character, location, and size to the ruin last described. The northern portion is situated on the opposite side of a deep canyon or ravine, on the crown of a hill composed of limestone, which outcrops everywhere about it, and is considerably higher than the small cluster on the south. The northern ruin is of considerable size and very compactly built, the rooms being clustered about the summit of the hill. The central room, occupying the crown of the hill, is 20 feet higher than the outside rooms. In a saddle between the main cluster and a similar hill toward the southeast there are a number of other rooms, not marked so prominently by débris as those of the main cluster. There is no standing wall remaining, but the débris of the main and adjoining clusters indicates that the masonry was very rough, the walls being composed of slabs of limestone similar to those found in the large ruin near the mouth of Limestone creek, and obtained probably not 20 feet away from their present position.

The ruin described on page 200 and assigned to the first subclass occurs about half a mile north of this limestone hill, on the opposite side of the river. This small ruin, like all the smaller ruins described, was built of river bowlders, or river bowlders with occasional slabs of sandstone or limestone, while the ruin last described consists exclusively of limestone slabs. This difference is explained, however, by the character of the sites occupied by the several ruins. The limestone hill upon which the ruin under discussion is situated is an anomalous feature, and its occurrence here undoubtedly determined the location of this village. It is difficult otherwise to understand the location of this cluster of rooms, for they command no outlook over tillable land, although the view up and down the river is extensive. This cluster, which is the largest in size for many miles up and down the river, may have been the parent pueblo, occupying somewhat the same relation to the smaller villages that Zuñi occupies to the summer farming settlements of Nutria, Pescado, and Ojo Caliente; and doubtless the single-room remains, which occur above and below the cluster on mesa benches and near tillable tracts, were connected with it. This ruin is an example of the second subclass, or villages located on defensive sites, which merges into ruins of the first subclass, or villages on bottom lands, through villages like that located at the mouth of the East Verde and at the mouth of Fossil creek.

FIG. 283.—Sketch map of ruin 9½ miles above Fossil creek.

On the eastern side of the Verde, just below the mouth of Beaver creek, opposite and a little above Verde, occurs one of the best examples to be found in this region of a large village located on a defensive

DETAILED VIEW OF RUIN ON SOUTHERN SIDE OF CLEAR CREEK.

site. Here there is a group of eight clusters extending half a mile up and down the river, and some of the clusters have walls still standing to a height of 8 and 10 feet. The relation of these clusters to each other is shown in the sketch map, figure 284.

The principal ruin of the group is situated on the northern side of a small valley running eastward from the river up to the foot of a prominent mesa, which here bounds the eastern side of the river bottom. The valley is perhaps half a mile long and about an eighth of a mile wide. The ruin is located on a butte or knoll connected with the hills back of it by a low saddle, forming a sort of promontory or tongue of land rising from a flat space or bench, the whole some 200 feet above the river bottom. One of the clusters of rooms is located in the saddle mentioned and is connected with the main ruin. At the foot of the

FIG. 284.—Sketch map showing location of ruins opposite Verde.

butte on the western side there is a similar cluster, not connected, however, with the main ruin; and south of the main ruin, on the extreme edge of the little mesa or bench, there is another small cluster. The ruin shown on the sketch map southwest of the main ruin consists of but two rooms, with no wall now standing. All these clusters are shown in their proper position on the ground plan, plate XVII. Plate XVIII, which is a general view from the east, shows the main ruin on the butte, together with the connected cluster east of it in the saddle. The modern settlement seen in the middle distance is Verde.

About a quarter of a mile west of the main ruin there is another small but well-preserved cluster of rooms. It occupies the narrow

ridge of a hill some 200 feet above the river. On the west and south the hill descends abruptly to the river; on the southeast and east it slopes sharply down to a broad valley on the level of the mesa bench before mentioned, but the valley is cut by a narrow and deep canyon marking the east side of the hill. This cluster is shown on the ground plan, plate XVII, though not in its proper position. Northeast of this cluster and perhaps 200 yards distant there are traces of other rooms, but they are so faint that no plan can be made out. As shown on the sketch map, figure 284, the hill is a long narrow one, and its western side falls rapidly to a large triangular area of flat bottom land lying between it and Beaver creek, which it overlooks, as well as a large area of the valley up the river and all the fine bottom lands north and east of Verde and on the northwestern side of Beaver creek. As regards outlook, and also as regards security and facility of defense, the site of the small cluster is far superior to that of the main cluster of rooms.

About a quarter of a mile south and east of the main ruin, on the opposite side of the little valley before mentioned, a mesa bench similar to the one last described occurs; and on a point of this, extending almost to the river bank, there are traces, now nearly obliterated, of a small cluster of rooms. A short distance east of this point there is a large rounded knoll, with a peculiar terrace-like bench at about half its height. The entire summit of this knoll was occupied by rooms, of which the walls are much broken and none remain standing. This knoll, with the ruins on its summit, is shown in plate XIX, which also gives a general view from the north of the small cluster southeast of the main ruin. The character of the valley of the Verde at this point is also shown. The sketch map, figure 284, shows the location of these ruins in reference to others of the group.

The main cluster, that portion occupying the crown or summit of the butte before described, exhibits at the present time some fifty rooms in the ground plan, but there were at one time a larger number than this; and there is no doubt that rooms extended down the slopes of the hill southward and southwestward. The plan of this main cluster is peculiar; it differs from all the smaller surrounding clusters. It tells the story of a long occupancy by a people who increased largely in numbers, but who, owing to their hostile environment, could not increase the space occupied by them in proportion to their numbers. It will be noticed that while the wall lines are remarkably irregular in arrangement they are more often continuous than otherwise, more frequently continuous, in fact, than the lines of some of the smaller villages before described. The rooms are remarkably small, 10 feet square being a not unusual measurement, and built so closely together as to leave no space for interior courts. The typical rooms in the ruins of this region are oblong, generally about twice as long as broad, measuring approximately 20 by 10 feet.

GENERAL VIEW OF RUIN 8 MILES NORTH OF FOSSIL CREEK.

In the ruin under discussion it seems that each of these oblong rooms was divided by a transverse partition into two smaller rooms, although the oblong form is also common. This is noticeable in the southwestern corner and on the eastern side of the main cluster, in the southwestern corner and on the northern end of the cluster adjoining on the north, and in all the smaller clusters. It is probable that the western central part of the main cluster was the first portion of the group of structures built, and that subsequently as the demand for accommodation increased, owing to increase of population, the rooms on the eastern and southern sides of the main cluster were added, while the rooms of the older portion were divided.

There is no evidence that any portion of this cluster attained a greater height than two stories, and only a small number of rooms reached that height. The small cluster adjoining on the north, and those on the southeast, southwest, and west, were built later and belong to the last period of the occupancy of the group. The builders exhibited a decided predilection for a flat site, as an examination of the sites of the various room clusters in the ground plan (plate XVII) will show, and when the sight of the main cluster became so crowded that additional rooms could be added only by building them on the sloping hillside, recourse was had to other sites. This tendency is also exhibited in the cluster adjoining the main cluster on the north, which was probably the second in point of age. The northern end of this small group of rooms terminates at the foot of the hill which rises northeastward, while a series of wall lines extends eastward at an angle with the lines of the cluster, but along the curve of the hillside.

The small northern cluster was in all probability inhabited by five or six families only, as contrasted with the main cluster, which had sixteen or seventeen, while the smaller clusters had each only two or three families. The strong presumption of the later building and occupancy of the smaller clusters, previously commented on, is supported by three other facts of importance, viz, the amount and height of the standing wall, the character of the sites occupied, and the extraordinary size of the rooms.

Although as a rule external appearance is an unsatisfactory criterion of age, still, other things equal, a large amount and good height of standing wall may be taken to indicate in a general way a more recent period of occupancy than wall lines much obliterated and merged into the surrounding ground level. The character of the site occupied is, however, a very good criterion of age. It was a rule of the ancient pueblo builder, a rule still adhered to with a certain degree of persistence, that enlargement of a village for the purpose of obtaining more space must be by the addition of rooms to those already built, and not by the construction of detached rooms. So well was this rule observed that attached rooms were often built on sites not at all adapted to them, when much better sites were available but a short

distance away; and, although detached rooms were built in certain cases, there was always a strong reason for such exceptions to the general rule. At a late period in the history of the Pueblos this rule was not so much adhered to as before, and detached houses were often built at such points as the fancy or convenience of the builder might dictate. As the traditions are broken down the tendency to depart from the old rule becomes more decided, and at the present day several of the older Pueblo villages are being gradually abandoned for the more convenient detached dwellings, while nearly all of them have suffered more or less from this cause.

The tendency to cluster rooms in one large compact group was undoubtedly due primarily to hostile pressure from outside, and as this pressure decreased the inherent inconveniences of the plan would assert themselves and the rule would be less and less closely adhered to. It therefore follows that, in the absence of other sufficient cause, the presence of detached rooms or small clusters may be taken in a general way to indicate a more recent occupancy than a ground plan of a compact, closely built village.

The size of rooms is closely connected with the character of the site occupied. When, owing to hostile pressure, villages were built on sites difficult of access, and when the rooms were crowded together into clusters in order to produce an easily defended structure, the rooms themselves were necessarily small; but when hostile pressure from surrounding or outside tribes became less pronounced, the pueblo-builders consulted convenience more, and larger rooms were built. This has occurred in many of the pueblos and in the ruins, and in a general way a ruin consisting of large rooms is apt to be more modern than one consisting of small rooms; and where large and small rooms occur together there is a fair presumption that the occupancy of the village extended over a period when hostile pressure was pronounced and when it became less strong. It has already been shown that, owing to the social system of the pueblo-builders, there is almost always growth in a village, although the population may remain stationary in numbers or even decrease; so that, until a village is abandoned it will follow the general rule of development sketched above.

Along the southern side of Clear creek, which discharges into the Rio Verde from the east, about 4 miles below Verde, there is a flat terrace from 30 to 40 feet above the creek and some 2 or 3 miles in length. Scattered over almost the whole of this terrace are remains of houses and horticultural works, which will be described later. Near the western end of the terrace a low hill with flat top and rounded sides rises, and on the top of this occurs the ruin whose ground plan is shown in figure 285.

This ruin commands an outlook over the whole extent of the terrace and seems to have been the home pueblo with which were connected the numerous single houses whose remains cover the terrace. The

GENERAL VIEW OF RUINS ON AN EMINENCE 14 MILES NORTH OF FOSSIL CREEK.

ground plan is peculiar. The rooms were arranged in four rows, each row consisting of a line of single rooms, and the rows were placed approximately at right angles to one another, forming the four sides of a hollow square. The rooms are generally oblong, of the usual dimensions, and as a rule placed with their longer axes in the direction of the row. Several rooms occur, however, with their longer axes placed across the row. Thirty-eight rooms can still be traced, and there is no

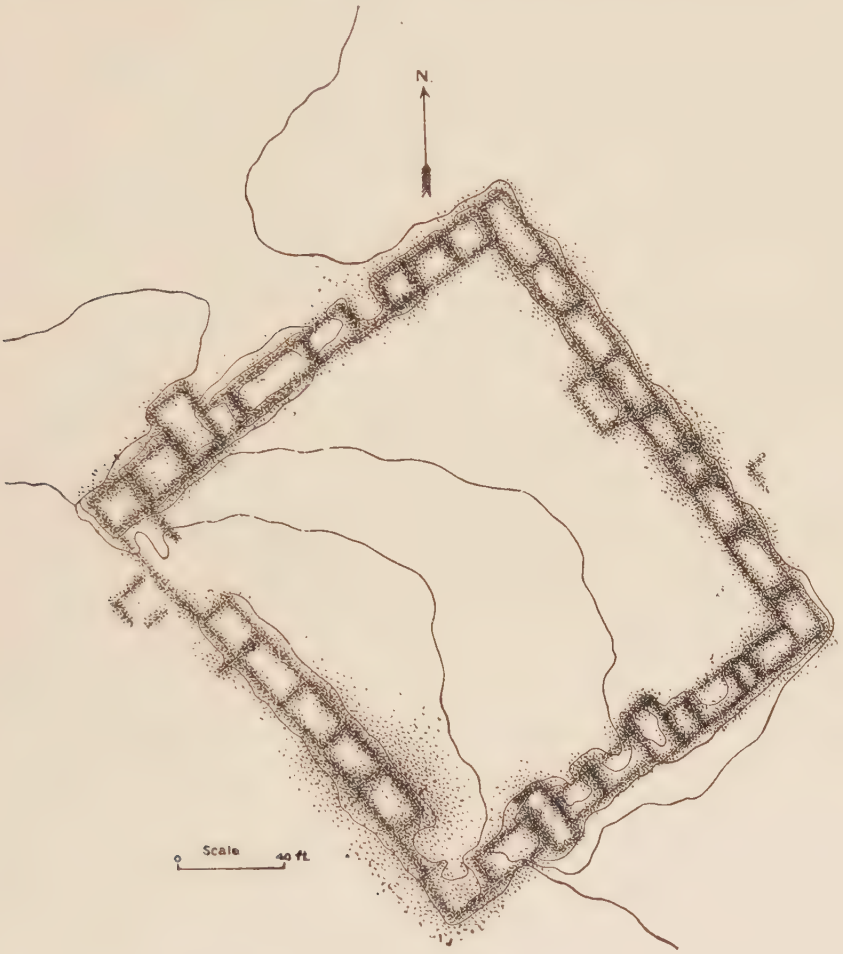


FIG. 285.—Ground plan of ruin on southern side of Clear creek.

likelihood that there were ever more than forty, or that any of the rooms attained a greater height than one story. The population, therefore, was probably never much in excess of fifty persons, or ten to twelve families.

It will be noticed that the wall lines are only approximately rectangular. The outside dimensions of the village are as follows: Northeastern side, 203 feet; southwestern, 207 feet; southeastern, 182 feet;

and northwestern, 194 feet. The northeastern and southwestern sides are nearly equal in length, but between the southeastern and the northwestern sides there is a difference of 12 feet, and this notwithstanding that the room at the western end of the southeastern row has been set out 3 feet beyond the wall line of the southwestern side. This difference is remarkable if, as the ground plan indicates, the village or the greater part of it was laid out and built up at one time, and was not the result of slow growth.

As already stated, long occupancy of a village, even without increase of population, produces a certain effect on the ground plan. This effect, so strongly marked in all the ruins already described, is conspicuous in this ruin by its almost entire absence. The ground plan is just such as would be produced if a small band of pueblo builders, consisting of ten or twelve related families, should migrate en masse to a site like the one under discussion and, after occupying that site for a few years—less than five—should pass on to some other location. Such migration and abandonment of villages were by no means anomalous; on the contrary, they constitute one of the most marked and most persistent phenomena in the history of the pueblo builders. If the general principles, already laid down, affecting the development and growth of ground plans of villages are applied to this example, the hypothesis suggested above—an incoming of people en masse and a very short occupancy—must be accepted, for no other hypothesis will explain the regularity of wall lines, the uniformity in size of rooms, and the absence of attached rooms which do not follow the general plan of the village. The latter is perhaps the most remarkable feature in the ground plan of this village. The addition of rooms attached irregularly at various points of the main cluster, which is necessarily consequent on long occupancy of a site, even without increase of population, was in this example just commenced. The result of the same process, continued over a long period of time, can be seen in the ground plan of any of the inhabited villages of today and in most of the ruins, while a plan like that of the ruin under discussion, while not unknown, is rare.

Plate XX, which is a general view of the ruin from the southwest, shows the character of the site and the general appearance of the débris, while plate XXI illustrates the character of the masonry. It will be noticed that the level of the ground inside and outside of the row of rooms is essentially the same; in other words, there has been no filling in. It will also be noticed that the amount of débris is small, and that it consists principally of rounded river bowlders. The masonry was peculiar, the walls were comparatively thin, and the lower courses were composed of river bowlders, not dressed or otherwise treated, while the upper courses, and presumably also the coping stones, were composed of slabs of sandstone and of a very friable limestone. The latter has disintegrated very much under atmospheric influences. The white

GENERAL VIEW OF NORTHERN END OF A GROUP OF CAVATE LODGES.

areas seen in the illustrations are composed of this disintegrated limestone. The general appearance of the ruin at the present time must not be accepted as its normal condition. It is probable that the débris has undergone a process of artificial selection, the flat slabs and most available stones for building probably having been removed by neighboring settlers and employed in the construction of stone fences, which

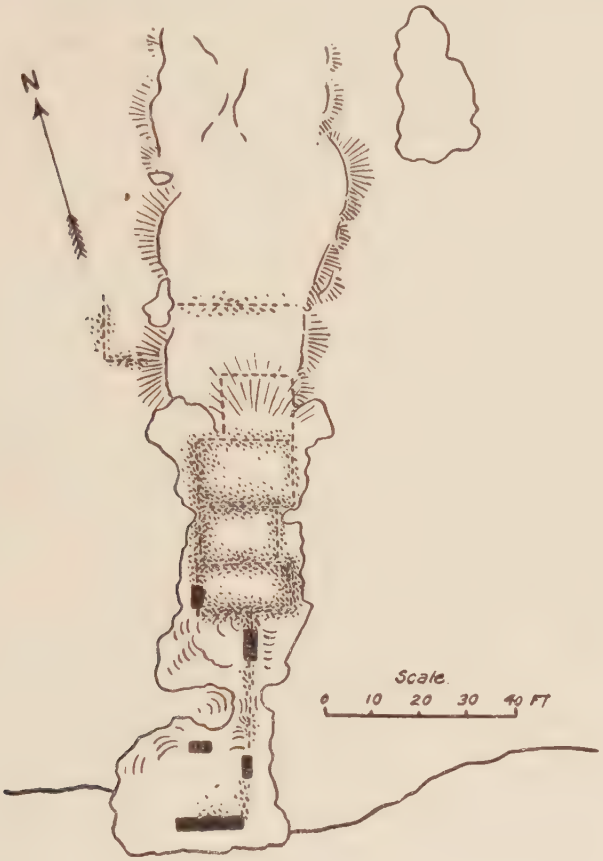


FIG. 286.—Ground plan of ruin 8 miles north of Fossil creek.

are much used in this region. Even with a fair allowance for such removal, however, there is no evidence that the rooms were higher than one story. The quantity of potsherds scattered about the ruins is noticeably small.

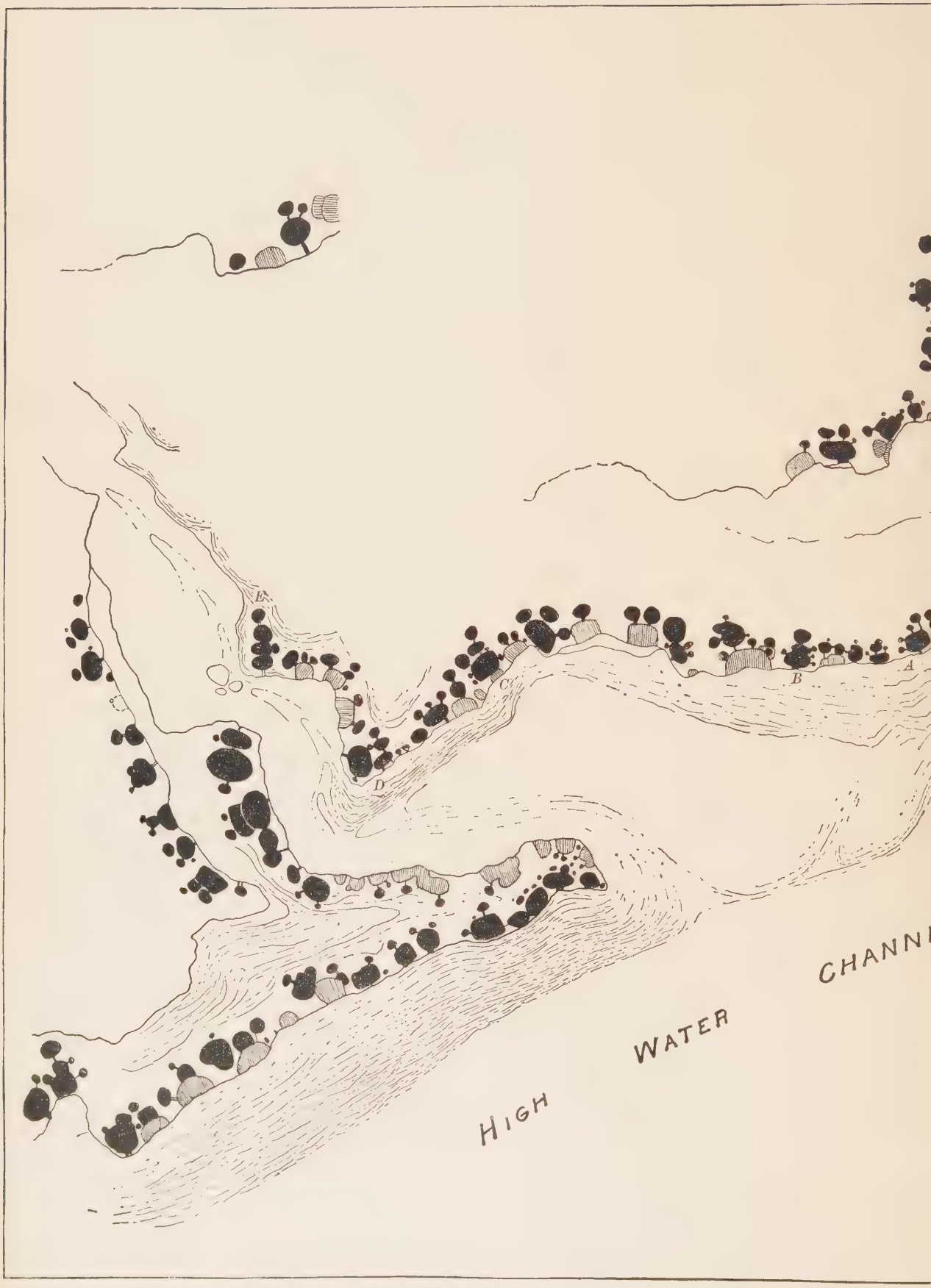
About 8 miles north of the mouth of Fossil creek, on the eastern side of the Verde, there is a ruin which, though very small, is interesting. At this point there is a long narrow mass of rock, the remains

of a volcanic dike, some 80 or 90 feet long, which at the southern end overhangs the stream, while the other end is merged into the ground level. At its southern end the rock is some 50 feet above the water, but 150 feet northward the dike is no longer traceable. A general view of this dike is given in plate XXII, while the ground plan, figure 286, shows the character of the site. There were rooms on all that portion of the dike that stands out prominently from the ground level, and traces of other rooms can be seen on the ground level adjoining on the north and in the causeway resulting from the breaking down and disintegration of the dike. Remains of eight rooms in all can be traced, five of which were on the summit of the rock. The wall lines on the summit are still quite distinct and in places fragments of the original walls remain, as shown on the ground plan. The plan shows typical pueblo rooms of average size, and the masonry, though rough, is of the same character as that of other ruins in the vicinity.

Facility of defense undoubtedly had something to do with the choice of this location, but that it was not the only desideratum consulted is evident from the occurrence of a large area of fertile bottom land or flat river terrace immediately adjoining the ruin on the east and overlooked by it; in fact, the volcanic dike on which the ruin occurs occupies the western end of a large semicircular area of tillable land, such as already described. Viewed, however, as a village located with reference to defense it is the most perfect example—facility of obtaining water being considered—in this region. It may be used, therefore, to illustrate an important principle governing the location of villages of this type.

A study of the ground plan (figure 286) and the general view (plate XXII) will readily show that while the site and character of this village are admirably adapted for defense, so well adapted, in fact, as to suggest that we have here a fortress or purely defensive structure, still this adaptation arises solely from the selection of a site fitted by nature for the purpose, or, in other words, from an accident of environment. There has not been the slightest artificial addition to the natural advantages of the site.

The statement may seem broad, but it is none the less true, that, so far as our knowledge extends at the present time, fortresses or other purely defensive structures form a type which is entirely unknown in the pueblo region. The reason is simple; military art, as a distinct art, was developed in a stage of culture higher than that attained by the ancient pueblo builders. It is true that within the limits of the pueblo region structures are found which, from their character and the character of their sites, have been loosely described as fortresses, their describers losing sight of the fact that the adaptability of these structures to defense is the result of nature and not of art. Numerous examples are found where the building of a single short wall would double the defensive value of a site, but in the experience of the writer the



MAP OF GROUP OF CAVATE LODGES IN WHITE CA

OF THE RIO VERDE.

80 160 FT
Scale.

MILES BELOW CLEAR CREEK, EAST SIDE RIO VERDE.

ancient builders have seldom made even that slight addition to the natural advantages of the site they occupied.

The first desideratum in the minds of the old pueblo builders in choosing the location of their habitations was nearness to some area of tillable land. This land was generally adjacent to the site of the village, and was almost invariably overlooked by it. In fact this requirement was considered of far more importance than adaptability to defense, for the latter was often sacrificed to the former. A good example in which both requirements have been fully met is the ruin under discussion. This, however, is the result of an exceptionally favorable environment; as a rule the two requirements conflict with each other, and it is always the latter requirement—adaptability to defense—which suffers. These statements are true even of the so-called fortresses, of the cavate lodges, of the cliff ruins, and of many of the large village ruins scattered over the southwestern portion of the United States. In the case of the large village ruins, however, there is another feature of pueblo life which sometimes produces a different result, viz, the use of outlying single houses or small clusters separated from the main village and used for temporary abode during the farming season only. This feature is well developed in some of the modern pueblos, particularly in Zuñi and Acoma.

The principle illustrated by this ruin is an important one. Among the ancient pueblo builders there was no military art, or rather the military art was in its infancy; purely defensive structures, such as fortresses, were unknown, and the idea of defense never reached any greater development than the selection of an easily defended site for a village, and seldom extended to the artifical improvement of the site. There is another result of this lack of military knowledge not heretofore alluded to, which will be discussed at length on some other occasion and can only be mentioned here: this is the aggregation of a number of small villages or clusters into the large many-storied pueblo building, such as the modern Zuñi or Taos.

About 14 miles north of the mouth of Fossil creek, on the eastern side of the river, there is another ruin somewhat resembling the last described. A large red rock rises at the intersection of two washes, about a mile back from the river, and on a bench near the summit are the remains of walls. These are illustrated in plate XXIII. In general appearance and in character of site this ruin strongly resembles a type found in the San Juan region. There seem to have been only a few rooms on the top of the rock, and the prominent wall seen in the illustration was probably a retaining or filling wall in a cleft of the rock. Such walls are now used among the Pueblos for the sides of trails, etc. It is probable that at one time there were a considerable number of rooms on the rock; the débris on the ground at the base of the rock on the western side, shown in the illustration, is rather scanty; on the opposite or eastern side there is more, and it is not improbable there

were rooms on the ground here. It is likely that access was from this side.

It should be noted that this ruin, which is of a type known as "fortress" by some writers, is so placed as to command an extensive outlook over the large valley below and over the two small valleys above, as well as the considerable area of flat or bottom land formed by the junction of the small valleys. It is a type of a subordinate agricultural settlement, and had the defensive motive been entirely absent from the minds of the builders of this village it would undoubtedly have been located just where it now is, as this is the best site for an agricultural settlement for some distance up and down the river.

Remains of walls somewhat similar to these last described occur on a butte or pinnacle on the eastern side of the river and about 7 miles

FIG. 287.—Sketch map of ruins on pinnacle 7 miles north of Fossil creek.

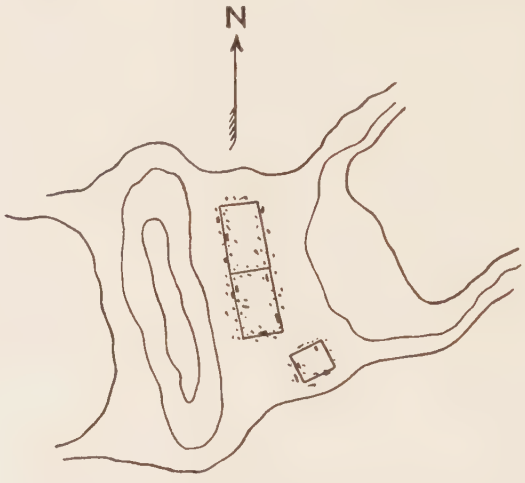


FIG. 288.—Remains of small rooms 7 miles north of Fossil creek.

north of the mouth of Fossil creek. From the south this pinnacle is a most conspicuous landmark, rising as it does some 2,500 feet above the river within a distance of a quarter of a mile. The upper 50 feet of the eminence consists of bare red rock split into sharp points and little pinnacles, as shown in figure 287, which represents only the upper portion of the butte. The heavy black lines on the sketch map are walls. Some of these were doubtless mere retaining walls, but others are still standing to a considerable height, and there is yet much débris on the slope of the rock forming the eastern side of the butte near its top. It is doubtful whether these rooms were ever used for habitations, and more probable that they were used as a shrine or for some analogous purpose.

Perhaps a quarter of a mile northeastward, in the saddle connecting the butte with the contiguous hills in that direction, there are remains of three small rooms, located east of a low swell or ridge. Figure 288

STRATA OF NORTHERN CANYON WALL.

shows the general character of the site, which seems to have been a favorite type for temporary structures, single-room outlooks, etc. Among the fragments of pottery picked up here were pieces of polished red ware of the southern type, and part of the bottom of a large pot of so-called corrugated ware.

Half a mile northwestward, in a saddle similar to that last described, and east of the crown of a hill, are the remains of a single room, nearly square and perhaps 10 feet long. These single rooms and small cluster remains are unusual in this region, and seem to replace the bowlder-marked ruins so common south of the East Verde (to be described more fully later). Although the walls of this single-room structure were built of river bowlders, they are well marked by débris and are of the same type as those in the ruins at the mouths of the East Verde and Fossil creek.

CAVATE LODGES.

Cavate lodges comprise a type of structures closely related to cliff houses and cave dwellings. The term is a comparatively new one, and the structures themselves are not widely known. They differ from the cliff houses and cave dwellings principally in the fact that the rooms are hollowed out of cliffs and hills by human agency, being cut out of soft rock, while the former habitations are simple, ordinary structures built for various reasons within a cove or on a bench in the cliffs or within a cave. The difference is principally if not wholly the result of a different physical environment, i. e., cavate lodges and cave dwellings are only different phases of the same thing; but for the present at least the name will be used and the cavate lodges will be treated as a separate class.

There are but three regions in the United States in which cavate lodges are known to occur in considerable numbers, viz, on San Juan river, near its mouth; on the western side of the Rio Grande near the pueblo of Santa Clara; and on the eastern slope of San Francisco mountain, near Flagstaff, Arizona. To these may now be added the middle Verde region, from the East Verde to a point north of Verde, Arizona.

Within the middle Verde region there are thousands of cavate lodges, sometimes in clusters of two or three, oftener in small groups, and sometimes in large groups comprising several hundred rooms. One of these large groups, located some 8 miles south of Verde on the eastern side of the river, has been selected for illustration.

The bottom lands of the Rio Verde in the vicinity of Verde have been already described, and the cavate lodges in question occur just below the southern end of this large area of tillable land, and some of them overlook it. The river at this point flows southward, and extending toward the east are two little canyons which meet on its bank. North and south of the mouth of the canyons the bank of the

river is formed by an inaccessible bluff 180 or 200 feet high. These bluffs are washed by the Verde during high water, though there is evidence that up to a recent time there was a considerable area of bottom land between the river and the foot of the bluff. Plate XXIV shows the northern end of the group from a low mesa on the opposite side of the river; the eastern bank of the river can be seen in the foreground, while the sandy area extending to the foot of the bluff is the present high-water channel of the Verde. The map (plate XXV) shows the distribution of the cavate lodges composing the group, and plate XXVI shows the character of the site. The cavate lodges occur on two distinct levels—the first, which comprises nearly all the cavate lodges, is at the top of the slopes of talus and about 75 feet above the river; the second is set back from 80 to 150 feet from the first tier horizontally and

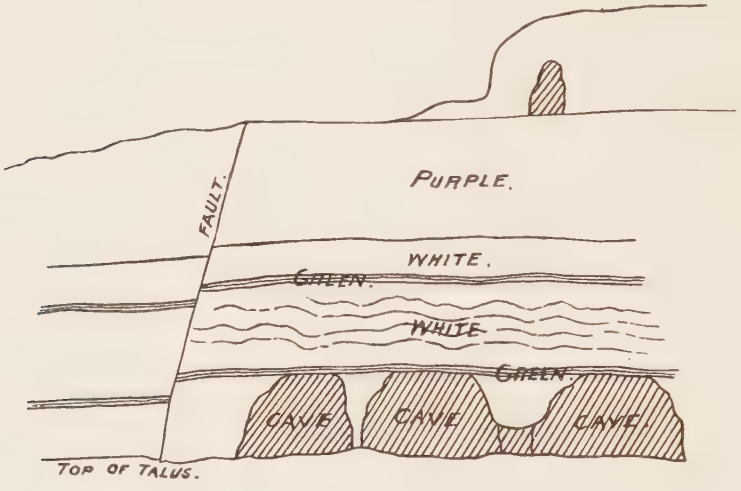


FIG. 289.—Diagram showing strata of canyon wall.

30 or 40 feet above it. The cavate lodges occur only in the face of the bluff along the river and in the lower parts of the two little canyons before mentioned. These canyons run back into the mesa seen in the illustration, which in turn forms part of the foothills rising into the range of mountains hemming in the Rio Verde on the east.

The walls of the canyon in the cavate-lodge area are composed of three distinct strata, clearly defined and well marked. The relations of the strata, at points on the northern and western sides of the north canyon, are shown in figure 289 and plate XXVI. The lowest stratum shown in the figure is that in which almost all the cavate lodges occur. It is about 8 feet thick and composed of a soft, very friable, purple-gray sandstone. Above it lies a greenish-white bed a few inches thick, followed by a stratum of a pronounced white, about 12 feet thick. This heavy stratum is composed of calcareous clay, and the green bed of a calcareous clay with a mixture of sand. The white stratum is divided at two-thirds its height by a thin belt of greenish-white rock, and above

RUIN ON NORTHERN POINT OF CAVATE LODGE CANYON.

it there is another belt of purple-gray sandstone about 12 feet thick. The top of this sandstone forms the ground surface south of the point shown in the diagram, while on the north and east it forms the floor of the upper tier of cavate lodges.

On the southern side of the canyon the lower purple stratum shows three distinct substrata; the upper is reddish purple and about 3½ feet thick, the middle is purple gray, about 7 feet thick, and apparently softer than the upper and lower strata. The lodges occur in the middle purple substratum, their floors composed of the upper surface of the lower stratum and their roofs of the under surface of the upper stratum. Those on the north side are similarly placed, their roofs being about 3 feet below the white, except that in several instances the upper part of the purple up to the white has fallen, making the cavity larger. This has occurred, however, since the abandonment of the caves, and the débris, still fresh looking, is in situ.

The formation in which the lodges occur is not of volcanic origin, although the beds composing it were perhaps deposited by hot springs during the period of great volcanic activity which produced San Francisco mountain in central Arizona and the great lava flows south of it. In view of the uncertainty on this point and the further fact that almost all the cavate lodges heretofore found were excavated in tufa, ash, or other soft volcanic deposits, the report of Mr. Joseph S. Diller, petrographer of the U. S. Geological Survey, will be of interest. It is as follows:

> The coarse-grained specimen is sandstone, that of medium grain is argillaceous sandstone, and the fine-grained one is calcareous clay. The coarse-grained friable sandstone, in which the lodges have been excavated, consists chiefly of subangular and rounded grains of quartz and feldspar with a small proportion of black particles. Many of the latter are magnetite, while the others are hornblende and various ferromagnesian silicates. I did not detect any fragments of volcanic origin.
>
> The specimen of argillaceous sandstone is made up of thin layers of fine-grained sand of the same sort as the first, alternating with others containing considerable clay. In the clay layers, a trace of carbonate of lime was found here and there, forming a transition of the calcareous clay.
>
> The calcareous clay when placed in acid effervesces vigorously, but when allowed to stand the effervescence ceases in a few minutes and the insoluble white clay remains.

All the strata composing this formation are very soft; the purple-gray material of the middle layer is so soft that its surface can be rubbed off with the hand. They are also minutely stratified or laminated, and the laminæ are not well cemented together, so that a blow on the roof of a cavity with a stone or other implement will bring off slabs varying from half an inch to an inch and a half in thickness. These thin strata or laminæ are of unequal hardness, weathering in places several inches into the face of the rock in thin streaks of a few inches or less. The middle purple stratum exhibits this quality somewhat more decidedly than the others, and this fact has doubtless determined the selection of this stratum for the location of the lodges,

as a room can be excavated in it more easily than a room of a similar size could be built up with loose rock.

The almost absolute dependence of the native builder on nature as he found it is well illustrated by these cavate lodges. At a point in the northern wall of the northernmost canyon, shown in the diagram (figure 289) and in plate XXVI, there is a small fault with a throw of about $2\frac{1}{2}$ feet, and the floors of the lodges west of the fault are just that much lower than the floors east of it. Furthermore, where the purple-gray stratum in which the lodges occur is covered up by the rising ground surface, the cavate lodges abruptly cease. In the northern and southern ends of the group the talus encroaches on and partly covers the purple-gray stratum, and in these places the talus has been removed from the face of the rock to permit the excavation of lodges. In short, the occurrence of the cavate lodges in this locality is determined absolutely by the occurrence of one particular stratum, and when that stratum disappears the lodges disappear. So far as can be ascertained without actually excavating a room there is no apparent difference between the stratum in which the lodges occur and the other purple strata above and below it. That there is some difference is indicated by the confinement of the lodges to that particular level, but that the difference is very slight is shown by the occurrence in two places of lodges just above the principal tier, a kind of second-story lodge, as it were. It is such differences in environment as these, however, often so slight as to be readily overlooked, which determine some of the largest operations carried on by the native builders, even to the building of some of the great many-storied pueblos, and, stranger still, sometimes leading to their complete abandonment.

In the region under discussion cavate lodges usually occur in connection with and subordinate to village ruins, and range in number from two or three rooms to clusters of considerable size. Here, however, the cavate lodge is the feature which has been most developed, and it is noteworthy that the village ruins that occur in connection with them are small and unimportant and occupy a subordinate position.

There are remains of two villages connected with the cavate lodges just described, perched on the points of the promontories which form the mouths of the two canyons before mentioned. The location of these ruins is shown in plate XXV. The one on the southern promontory is of greater extent than that on the northern point, and both are now much broken down, no standing wall remaining. A general view of the ruin on the northern promontory is given in plate XXVII, and the same illustration shows the remains of the other village on the flat top of the promontory in the farther part of the foreground.

The cavate lodges are generally rudely circular in shape, sometimes oblong, but never rectangular. The largest are 25 and even 30 feet in diameter, and from this size range down to 5 or 6 feet and thence down to little cubby-holes or storage cists. Owing to their similarity,

CAVATE LODGE WITH WALLED FRONT.

particularly in point of size, it is difficult to draw a line between small rooms and large storage cists, but including the latter there are two hundred rooms on the main level, divided into seventy-four distinct and separate sets. These sets comprise from one to fourteen rooms each. On the upper level there are fifty-six rooms, divided into twenty-four sets, making a total of two hundred and fifty-six rooms. As nearly as can be determined by the extent of these ruins the population of the settlement was probably between one hundred and fifty and two hundred persons.

There is great variety in the rooms, both in size and arrangement. As a rule each set or cluster of rooms consists of a large apartment, entered by a narrow passageway from the face of the bluff, and a number of smaller rooms connected with it by narrow doorways or short passages and having no outlet except through the large apartment.

FIG. 290.—Walled storage cist.

As a rule two or more of these smaller back rooms are attached to the main apartment, and sometimes the back rooms have still smaller rooms attached to them. In several cases there are three rooms in a series or row extending back into the rock, and in one instance (at the point marked *E* on the map, plate XXV) there are four such rooms, all of good size.

Attached to the main apartment, and sometimes also to the back rooms, there are usually a number of storage cists, differing from the smaller rooms of the cluster only in size. These cists or cubby-holes range in size from a foot to 5 feet in diameter, and are nearly always on a level of the floor, although in some instances they extend below it.

Storage cists are also sometimes excavated in the exterior walls of the cliffs, and occasionally they are partly excavated and partly inclosed by a rough, semicircular wall. An example of the latter type is shown in figure 290.

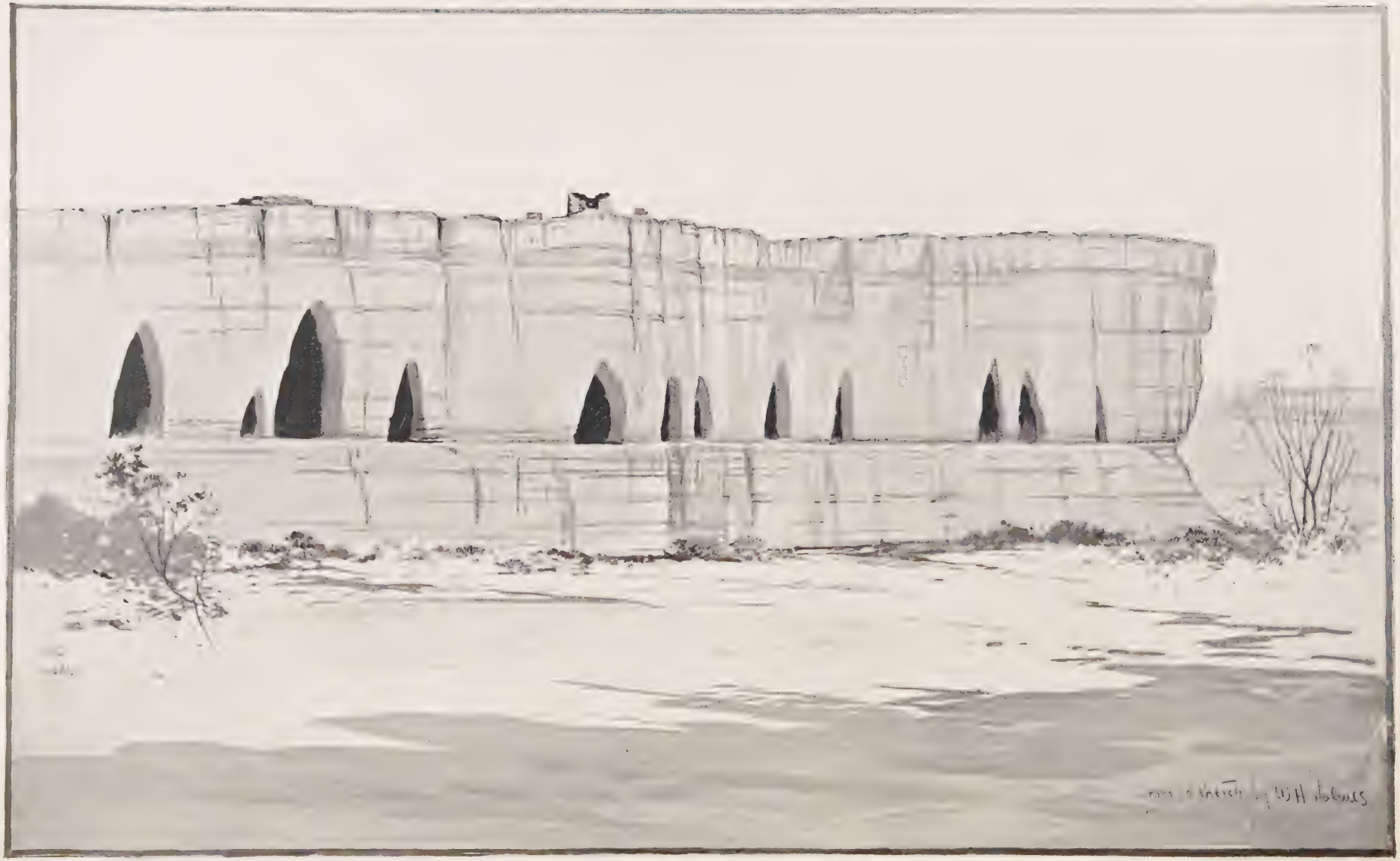
As a rule the cavate lodges are set back slightly from the face of the bluff and connected with it by a narrow passageway. Another type, however, and one not uncommon, has no connecting passageway, but instead opens out to the air by a cove or nook in the bluff. This cove was used as the main room and the back rooms opened into it in the usual way by passageways. A number of lodges of this type can be seen in the eastern side of the northern promontory or bluff. Possibly lodges of this type were walled in front, although walled fronts are here exceptional, and some of them at least have been produced by the falling off of the rock above the doorway. The expedient of walling up the front of a shallow cavity, commonly practiced in the San Juan region, while comparatively rare in this vicinity, was known to the dwellers in these cavate lodges. At several points remains of front walls can be seen, and in two instances front walls remain in place. The masonry, however, is in all cases very rough, of the same type as that shown in plate XXVIII.

In this connection a comparison with the cavate lodges found in other regions will be of interest. In 1875 Mr. W. H. Holmes, then connected with the Hayden survey, visited a number of cavate lodges on the Rio San Juan and some of its tributaries. Several groups are illustrated in his report.[1] Two of his illustrations, showing, respectively, the open front and walled front lodges, are reproduced in plates XXIX and XXX. The open front lodges are thus described:

> I observed, in approaching from above, that a ruined tower stood near the brink of the cliff, at a point where it curves outward toward the river, and in studying it with my glass detected a number of cave-like openings in the cliff face about halfway up. On examination, I found them to have been shaped by the hand of man, but so weathered out and changed by the slow process of atmospheric erosion that the evidences of art were almost obliterated.
>
> The openings are arched irregularly above, and generally quite shallow, being governed very much in contour and depth by the quality of the rock. The work of excavation has not been an extremely great one, even with the imperfect implements that must have been used, as the shale is for the most part soft and friable.
>
> A hard stratum served as a floor, and projecting in many places made a narrow platform by which the inhabitants were enabled to pass along from one house to another.
>
> Small fragments of mortar still adhered to the firmer parts of the walls, from which it is inferred that they were at one time plastered. It is also extremely probable that they were walled up in front and furnished with doors and windows, yet no fragment of wall has been preserved. Indeed, so great has been the erosion that many of the caves have been almost obliterated, and are now not deep enough to give shelter to a bird or bat.

Walled fronts, the author states, were observed frequently on the Rio Mancos, where there are many well-preserved specimens. He

[1] Tenth Ann. Rep. U. S. Geol. Survey, 1876, pp. 288–391.



OPEN FRONT CAVATE LODGES ON THE RIO SAN JUAN.

described a large group situated on that stream, about 10 miles above its mouth, as follows:

The walls were in many places quite well preserved and new looking, while all about, high and low, were others in all stages of decay. In one place in particular, a picturesque outstanding promontory has been full of dwellings, literally honeycombed by this earth-burrowing race, and as one from below views the ragged, window-pierced crags [*see* plate XXX] he is unconsciously led to wonder if they are not the ruins of some ancient castle, behind whose moldering walls are hidden the dread secrets of a long-forgotten people; but a nearer approach quickly dispels such fancies, for the windows prove to be only the doorways to shallow and irregular apartments, hardly sufficiently commodious for a race of pigmies. Neither the outer openings nor the apertures that communicate between the caves are large enough to allow a person of large stature to pass, and one is led to suspect that these nests were not the dwellings proper of these people, but occasional resorts for women and children, and that the somewhat extensive ruins in the valley below were their ordinary dwelling places.

It will be noticed that in both these cases there are associated ruins on the mesa top above, and in both instances these associated ruins are subordinate to the cavate lodges, in this respect resembling the lodges on the Verde already described. This condition, however, is not the usual one; in the great majority of cases the cavate lodges are subordinate to the associated ruins, standing to them in the relation of outlying agricultural shelters. Unless this fact is constantly borne in mind it is easy to exaggerate the importance of the cavate lodges as compared with the village ruins with which they are connected.

The cavate lodges near San Francisco mountain in Arizona were visited in 1883 by Col. James Stevenson, of the Bureau of Ethnology, and in 1885 by Maj. J. W. Powell. Major Powell[1] describes a number of groups in the vicinity of Flagstaff. Of one group, situated on a cinder cone about 12 miles east of San Francisco peak, he says:

Here the cinders are soft and friable, and the cone is a prettily shaped dome. On the southern slope there are excavations into the indurated and coherent cinder mass, constituting chambers, often 10 or 12 feet in diameter and 6 to 10 feet in height. The chambers are of irregular shape, and occasionally a larger central chamber forms a kind of vestibule to several smaller ones gathered about it. The smaller chambers are sometimes at the same altitude as the central or principal one, and sometimes at a lower altitude. About one hundred and fifty of these chambers have been excavated. Most of them are now partly filled by the caving in of the walls and ceilings, but some of them are yet in a good state of preservation. In these chambers, and about them on the summit and sides of the cinder cone, many stone implements were found, especially metates. Some bone implements also were discovered. At the very summit of the little cone there is a plaza, inclosed by a rude wall made of volcanic cinders, the floor of which was carefully leveled. The plaza is about 45 by 75 feet in area. Here the people lived in underground houses—chambers hewn from the friable volcanic cinders. Before them, to the south, west, and north, stretched beautiful valleys, beyond which volcanic cones are seen rising amid pine forests. The people probably cultivated patches of ground in the low valleys.

About 18 miles still farther to the east of San Francisco mountain another ruined village was discovered, built about the crater of a volcanic cone. This volcanic peak is of much greater magnitude. The crater opens to the eastward. On the

[1] Seventh Ann. Rep. Bur. Eth., 1891, p. xix.

south many stone dwellings have been built of the basaltic and cinder-like rocks. Between the ridge on the south and another on the northwest there is a low saddle in which other buildings have been erected, and in which a great plaza was found, much like the one previously described. But the most interesting part of this village was on the cliff which rose on the northwest side of the crater. In this cliff are many natural caves, and the caves themselves were utilized as dwellings by inclosing them in front with walls made of volcanic rocks and cinders. These cliff dwellings are placed tier above tier, in a very irregular way. In many cases natural caves were thus utilized; in other cases cavate chambers were made; that is, chambers have been excavated in the friable cinders. On the very summit of the ridge stone buildings were erected, so that this village was in part a cliff village, in part cavate, and in part the ordinary stone pueblo. The valley below, especially to the southward, was probably occupied by their gardens. In the chambers among the overhanging cliffs a great many interesting relics were found, of stone, bone, and wood, and many potsherds.

It will be seen that the first group described bears a remarkably close resemblance to the cavate lodges on the Rio Verde. The lodges themselves are smaller, but the arrangement of main apartment and attached back rooms is quite similar. It will be noticed also that in the second group described village ruins are again associated on the summit of the cliff or ridge. Major Powell ascertained that these cavate lodges were occupied by the Havasupai Indians now living in Cataract canyon, who are closely related to the Walapai, and who, it is said, were driven from this region by the Spaniards.

The cavate lodges on the Rio Grande, in New Mexico, in the vicinity of the modern pueblo of Santa Clara, were also visited in 1885 by Major Powell and are thus described by him:[1]

The cliffs themselves are built of volcanic sands and ashes, and many of the strata are exceedingly light and friable. The specific gravity of some of these rocks is so low that they will float on water. Into the faces of these cliffs, in the friable and easily worked rock, many chambers have been excavated; for mile after mile the cliffs are studded with them, so that altogether there are many thousands. Sometimes a chamber or series of chambers is entered from a terrace, but usually they were excavated many feet above any landing or terrace below, so that they could be reached only by ladders. In other places artificial terraces were built by constructing retaining walls and filling the interior next to the cliffs with loose rock and sand. Very often steps were cut into the face of a cliff and a rude stairway formed by which chambers could be reached. The chambers were very irregularly arranged and very irregular in size and structure. In many cases there is a central chamber, which seems to have been a general living room for the people, back of which two, three, or more chambers somewhat smaller are found. The chambers occupied by one family are sometimes connected with those occupied by another family, so that two or three or four sets of chambers have interior communication. Usually, however, the communication from one system of chambers to another was by the outside. Many of the chambers had evidently been occupied as dwellings. They still contained fireplaces and evidences of fire; there were little caverns or shelves in which various vessels were placed, and many evidences of the handicraft of the people were left in stone, bone, horn, and wood, and in the chambers and about the sides of the cliffs potsherds are abundant. On more careful survey it was found that many chambers had been used as stables for asses, goats, and sheep. Sometimes they had been filled a few inches, or even 2 or 3 feet, with the excrement

[1] Seventh Ann. Rep. Bur. Eth., op. cit., p. XXII.

WALLED FRONT CAVATE LODGES ON THE RIO SAN JUAN.

CAVATE LODGES ON THE RIO GRANDE.

of these animals. Ears of corn and corncobs were also found in many places. Some of the chambers were evidently constructed to be used as storehouses or caches for grain. Altogether it is very evident that the cliff houses have been used in comparatively modern times; at any rate, since the people owned asses, goats, and sheep. The rock is of such a friable nature that it will not stand atmospheric degradation very long, and there is abundant evidence of this character testifying to the recent occupancy of these cavate dwellings.

Above the cliffs, on the mesas, which have already been described, evidences of more ancient ruins were found. These were pueblos built of cut stone rudely dressed. Every mesa had at least one ancient pueblo upon it, evidently far more ancient than the cavate dwellings found in the face of the cliffs. It is, then, very plain that the cavate dwellings are not of great age; that they have been occupied since the advent of the white man, and that on the summit of the cliffs there are ruins of more ancient pueblos.

Major Powell obtained a tradition of the Santa Clara Indians, reciting three successive periods of occupancy of the cavate lodges by them, the last occurring after the Spanish conquest of New Mexico in the seventeenth century.

It will be noticed that here again the cavate lodges and village ruins are associated, although in this case the village ruins on the mesas above are said to be more ancient than the cavate lodges. A general view of a small section of cliff containing lodges is given in plate XXXI, for comparison with those on the Verde. The lodges on the Rio Grande seem to have been more elaborate than those on the Verde, perhaps owing to longer occupancy; but the same arrangement of a main front room and attached back rooms, as in the cavate lodges on the Verde, was found.

As the cavate lodges of the San Francisco mountain region have been assigned to the Havasupai Indians of the Yuman stock, and those of the Rio Grande to the Santa Clara pueblo Indians of the Tanoan stock, it may be of interest to state that there is a vague tradition extant among the modern settlers of the Verde region that the cavate lodges of that region were occupied within the last three generations. This tradition was derived from an old Walapai Indian whose grandfather was alive when the cavate lodges were occupied. It was impossible to follow this tradition to its source, and it is introduced only as a suggestion. Attention is called, however, to the tradition given in the introduction to this paper with which it may be connected.

Aside from the actual labor of excavation, there was but little work expended on the Verde cavate lodges. The interiors were never plastered, so far as the writer could determine. Figure 291 shows the plan of one of the principal sets of rooms, which occurs at the point marked *D* on the map, plate XXV; and plate XXXII is an interior view of the principal room, drawn from a flashlight photograph. This set of rooms was excavated in a point of the cliff and extends completely through it, as shown on the general plan, plate XXV. The entrance was from the west by a short passageway opening into a cove extending back some

10 feet from the face of the cliff. The first room entered measures 16 feet in length by 10 feet in width. On the floor of this room a structure resembling the piki or paper bread oven of the Tusayan Indians, was found constructed partly of fragments of old and broken metates.

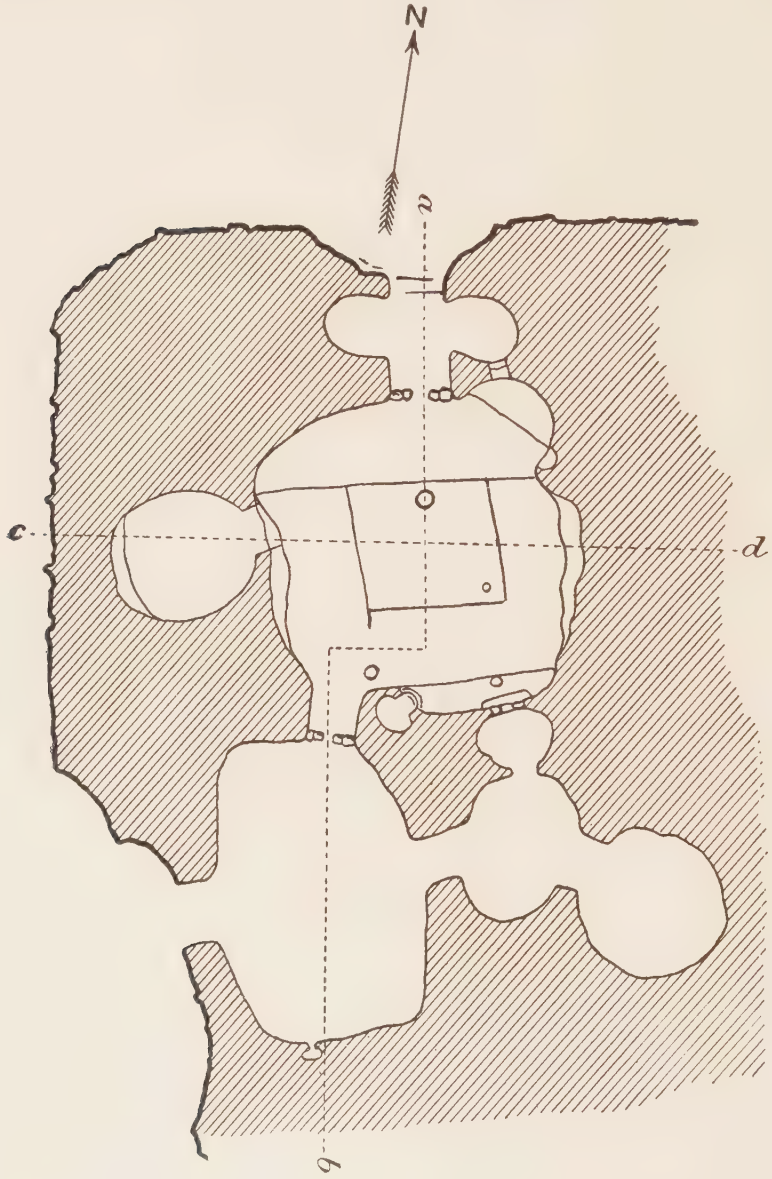
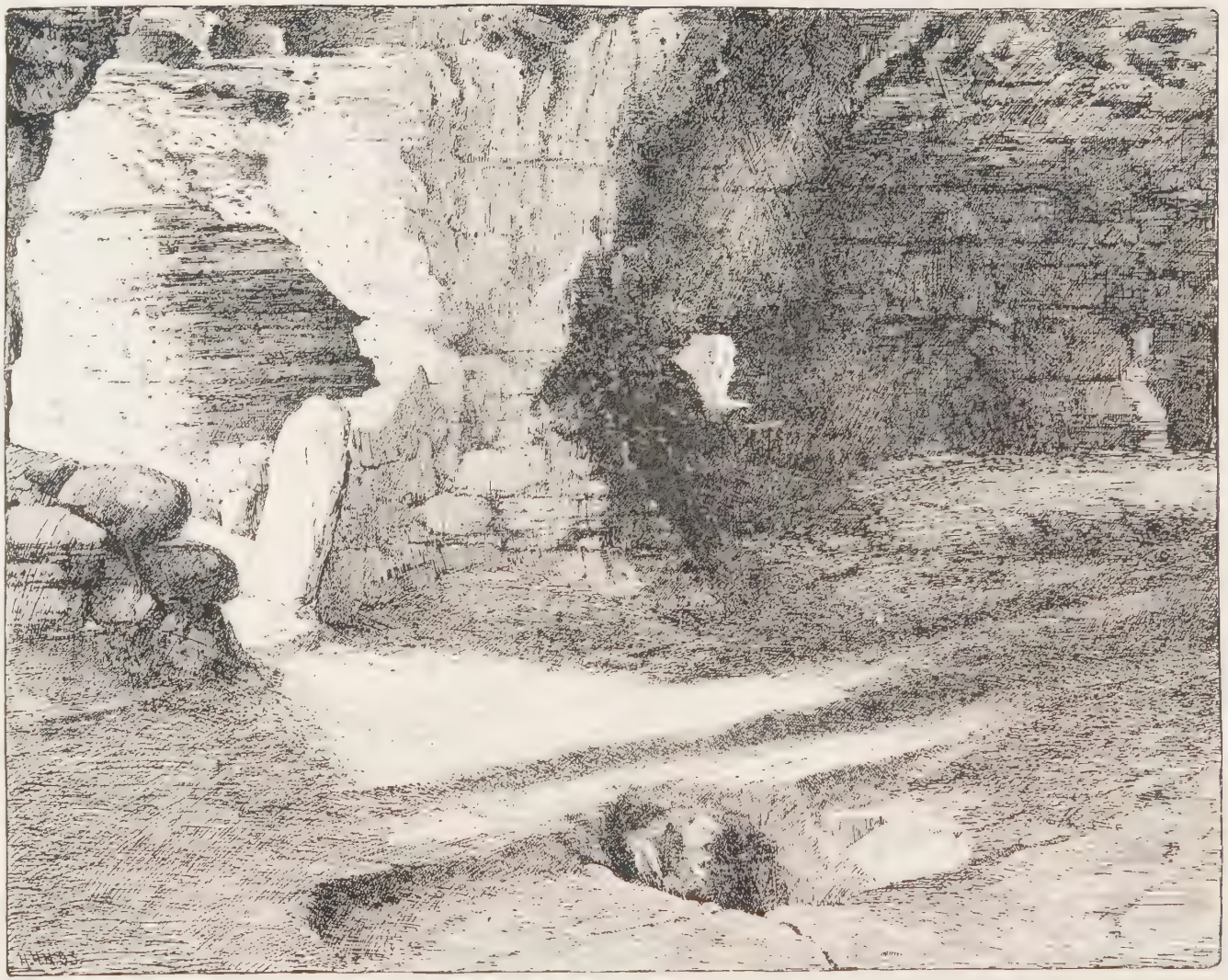


FIG. 291.—Plan of cavate lodges, group *D*.

At the southern end of the room there is a cubby-hole about a foot in diameter, excavated at the floor level. At the eastern end of the room there is a passageway about 2½ feet long leading into a smaller roughly circular room, measuring 7½ feet in its longest diameter, and this in



INTERIOR VIEW OF CAVATE LODGE, GROUP D.

turn is connected with another almost circular room of the same size. The floors of all three of these rooms are on the same level, but the roofs of the two smaller rooms are a foot lower than that of the entrance room. At the northern end of the entrance room there is a passageway 3 feet long and 2½ feet wide leading into the principal room of the set. This passageway at its southern end has a framed doorway of the type illustrated later.

The main room is roughly circular in form, measuring 16 feet in its north and south diameter and 15 feet from east to west. The roof is about 7 feet above the floor. Figure 292 shows a section from northwest to southwest (*a*, *b*, figure 291) through the small connected room

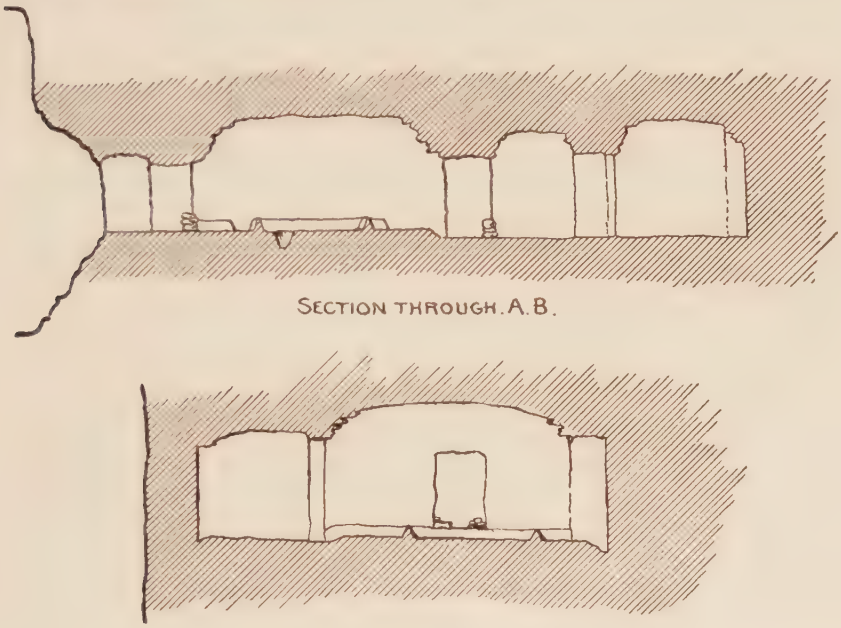


FIG. 292.—Sections of cavate lodges, group *D*.

adjoining on the south, and also an east and west section (*c*, *d*, figure 291). The floor is plastered with clay wherever it was necessary in order to bring it to a level, and the coating is consequently not of uniform thickness. It is divided into sections by low ridges of clay as shown in the plan and sections; the northern section is a few inches higher than the other. Extending through the clay finish of the floor and into the rock beneath there are four pits, indicated on the plan by round spots. The largest of these, situated opposite the northern door, was a fire hole or pit about 18 inches in diameter at the floor level, of an inverted conical shape, about 10 inches in depth, and plastered inside with clay inlaid with fragments of pottery placed as closely together as their shape would permit. The other pits are smaller; one located near the southeastern corner of the room is about 6 inches in diameter

and the same in depth, while the others are mere depressions in the floor, in shape like the small paint mortars used by the Pueblos.

The room, when opened, contained a deposit of bat dung and sand about 3 feet thick in the center and averaging about 2 feet thick throughout the room. This deposit exhibited a series of well-defined strata, varying from three-fourths to an inch and a half thick, caused by the respective predominance of dung or sand. No evidence of disturbance of these strata was found although careful examination was made. This deposit was cleared out and a number of small articles were found, all resting, however, directly on the floor. The articles consisted of fragments of basketry, bundles of fibers and pieces of fabrics, pieces of arrowshafts, fragments of grinding stones, three sandals of woven yucca fiber, two of them new and nearly perfect, and a number of pieces of cotton cloth, the latter scattered over the room and in several instances gummed to the floor. Only a few fragments of pottery were found in the main room, but outside in the northern passageway were the fragments of two large pieces, one an olla, the other a bowl, both buried in 3 or 4 inches of débris under a large slab fallen from the roof.

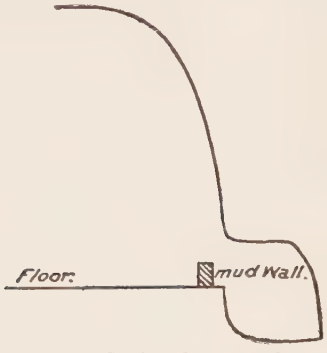


FIG. 293.—Section of water pocket.

Owing to its situation this room was one of the most desirable in the whole group. The prevailing south wind blows through it at all times, and this is doubtless the reason that it was so much filled up with sand. In the center of the room the roof has fallen at a comparatively recent date from an area about 10 by 7 feet, in slabs about an inch thick, for the fragments were within 6 inches of the top of the débris. The walls are smoke-blackened to a very slight extent compared with the large room south of it.

At the northeastern and southwestern corners there are two small pockets, opening on the floor level but sunk below it, which seem to have been designed to contain water. That in the southwest corner is the larger; it is illustrated in the section, figure 293. As shown in the section and on the plan (figure 291), a low wall composed of adobe mortar and broken rock was built across the opening on the edge of the floor, perhaps to increase its capacity. This cavity would hold 15 to 20 gallons of water, a sufficient amount to supply the needs of an ordinary Indian family for three weeks or a month. The pocket in the northeastern corner of the room is not quite so large as the one described, and its front is not walled.

West of the main room there is a storage room, nearly circular in shape, with a diameter of about 6 feet and with a floor raised about 2 feet above that of the main room. Its roof is but 3 feet above the floor, and across its western end is a low bench a couple of inches above the

BOWLDER-MARKED SITE.

floor. In the northeastern corner there is a shallow cove, also raised slightly above the main floor and connecting by a narrow opening with the outer vestibule-like rooms on the north. These northern rooms of the lodge seem to be simply enlargements of the passageway. The northern opening is a window rather than a door as it is about 10 feet above the ground and therefore could be entered only by a ladder. The opening is cut in the back of a cove in the cliff, and is 6 feet from the northern end of the main room. At half its length it has been enlarged on both sides by the excavation of niches or coves about 4 feet deep but only 2½ feet high. These coves could be used only for storage on a small scale.

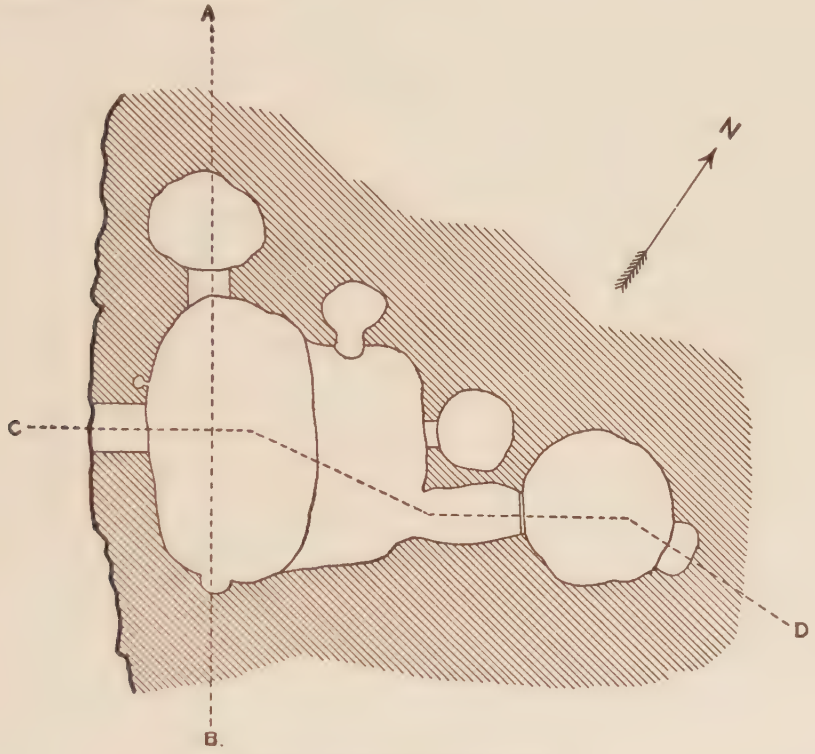


FIG. 294.—Plan of cavate lodges, group *A*.

In the southeastern corner of the main room there is another opening leading into a low-roofed storage cist, approximating 4 feet in diameter, and this cist was in turn connected with the middle one of the three rooms first described. This opening, at the time the room was examined, was so carefully sealed and plastered that it was scarcely perceptible.

A different arrangement of rooms is shown in plan in figure 294 and in section in figure 295. This group occurs at the point marked *A* on the map. The entrance to the main room was through a narrow passage, 3 feet long, leading into the chamber from the face of the bluff, which at

this point is vertical. The main room is oblong, measuring 17 feet one way and 10 the other. At the southern end there is a small cist and on the western side near the entrance there is another hardly a foot in diameter. North of the main room there is a small, roughly circular room with a diameter of about 6 feet. It is connected with the main room by a passage about 2 feet long. On the floor of the main room there are two low ridges of clay, similar to those already described, which divide it into three sections of nearly equal size.

East of the main room there is another of considerable size in the form of a bay or cove. It measures 13 feet by 6 feet, and its floor is 20 inches higher than that of the main room, as shown in the section (figure 295). Attached to this bay, at its northern end, is a small cist about 3

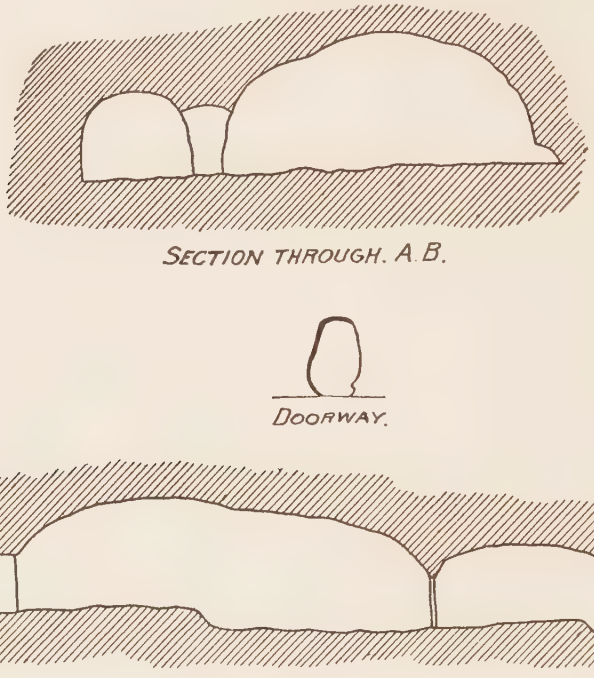


FIG. 295.—Sections of cavate lodges, group A.

feet in diameter, and with its floor sunk to the level of the floor of the main room. East of the cove there is another cist about 4½ feet in diameter and with its floor on the level of the cove. Adjoining it on the south and leading out from the southeastern corner of the cove or bay, there is a long passage leading into an almost circular room 9 feet in diameter. The back wall of this room is 33 feet from the face of the cliff. The passage leading into it is 6 feet long, 2½ feet wide at the doorways, bulging slightly in the center, and its floor is on the same level as the rooms it connects; its eastern end is defined by a ridge of clay about 6 inches high.

IRRIGATING DITCH ON THE LOWER VERDE.

In the eastern side of the circular room last described there is a storage cist about 3 feet wide and 2 feet deep. No fire-pit was seen in this cluster, although if the principal apartment were carefully cleaned out it is not improbable that one might be found.

A cluster of rooms somewhat resembling the last described is shown in plan in figure 296. This cluster occurs at the point marked *B* on the map. The main room is set back 5½ feet from the face of the bluff, which is vertical at this point, and is oblong in shape, measuring 19½ by 11½ feet. Its roof is 7½ feet above the floor in the center of the room. Attached to its southern end by a passage only a foot in length is a small room or storage cist about 5 feet in diameter. At its northeastern corner there is another room or cist similar in shape, about 7 feet in diameter, and reached by a passage 2 feet long. This small

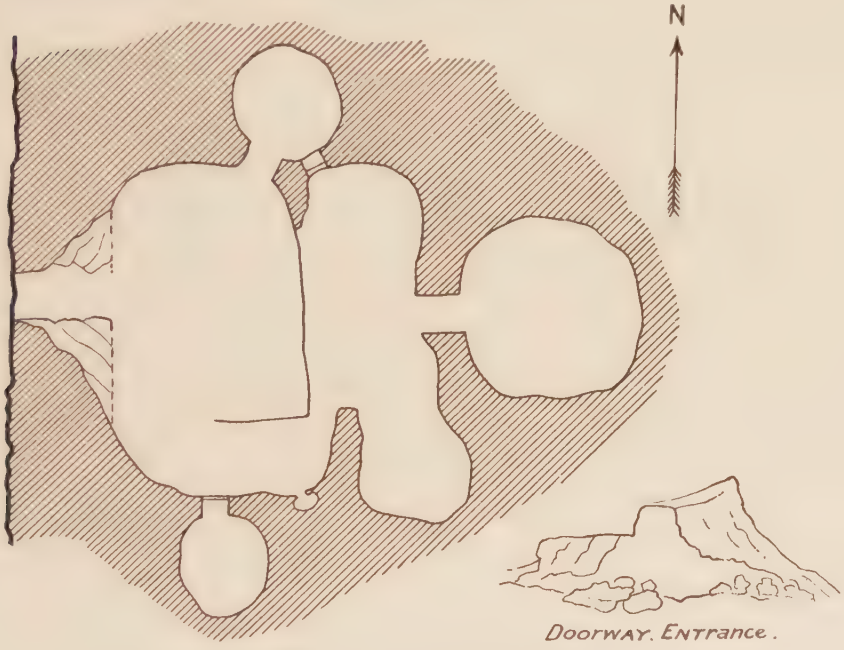


FIG. 296.—Plan of cavate lodges, group *B*.

room is also connected with a long room east of the main apartment by a passage, the southern end of which was carefully sealed up and plastered, making a kind of niche of the northern end. At the southeastern corner of the room there is a small niche about 2 feet in diameter on the level of the floor.

The eastern side of the main room is not closed, but opens directly into an oblong chamber of irregular size with the roof nearly 2 feet lower and the floor a foot higher than the main room. This step in the floor is shown by the line between the rooms on the ground plan. The second room is about 6 feet wide and 20 feet long, its southern end rounding out slightly so as to form an almost circular chamber. Near

the center of its eastern side there is a passageway 2½ feet long leading into a circular chamber 10½ feet in diameter and with its floor on the same level as the room to which it is attached. The back wall of this room is 35½ feet from the face of the cliff.

A group occuring at the point marked *E* on the map (plate XXV) is shown in plan in figure 297. It is located in a projecting corner of the bluff and marks the eastern limit of the cavate lodges at this end of the canyon. The group consists of five rooms, and has the distinction of extending four rooms deep into the rock. The main room is set back about 13 feet from the face of the bluff, about 7 feet of this distance being occupied by a narrow passageway and the remainder by a cove. The depth from the face of the bluff to the back of the innermost chamber is 47 feet. The main room measures 16 feet in length and 11 feet in width, and its roof is less than 7 feet high in the center. Near its center and opposite the long passageway mentioned there is a fire-pit nearly 3 feet in diameter.

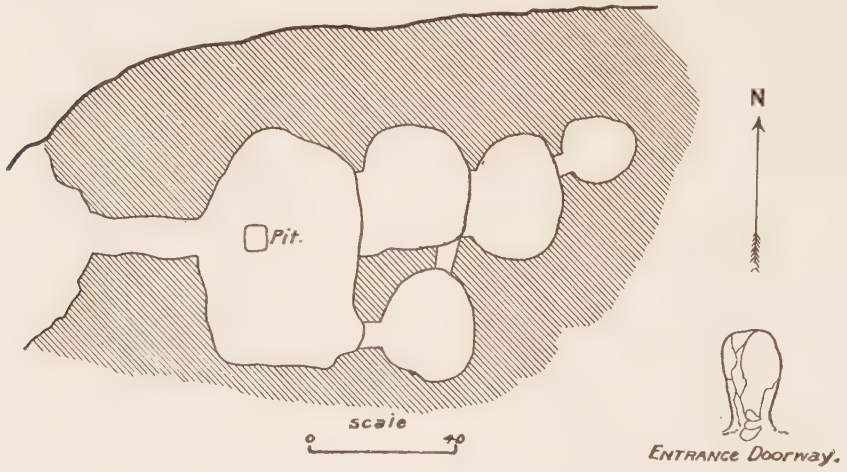


FIG. 297.—Plan of cavate lodges, group *E*.

At the northeastern corner of the main room there is a wide opening leading into a room measuring 8 by 7 feet, with a floor raised 2 feet above that of the principal apartment. The roof of this chamber is but 4½ feet above the floor. Almost the whole eastern side of this room is occupied by a wide opening leading into another room of approximately the same size and shape. The roof of this room is only 3 feet 10 inches above the floor, and the floor is raised 6 inches above that on the west. In the northeastern corner there is a short narrow passageway leading into a small circular room, the fourth of the series, having a diameter of 4 feet. The roof of this apartment is only 3 feet above the floor.

In the southeastern corner of the main room there is a narrow passageway leading into a circular chamber about 8 feet in diameter. This chamber is connected with the second room of the series described by a passageway about 2 feet long, which opens into the southeastern

OLD IRRIGATING DITCH, SHOWING CUT THROUGH LOW RIDGE.

corner of that room. This passageway, at its northern end, is 1½ feet below the room into which it opens. One of the most noticeable features about this group of rooms is the entire absence of the little nooks

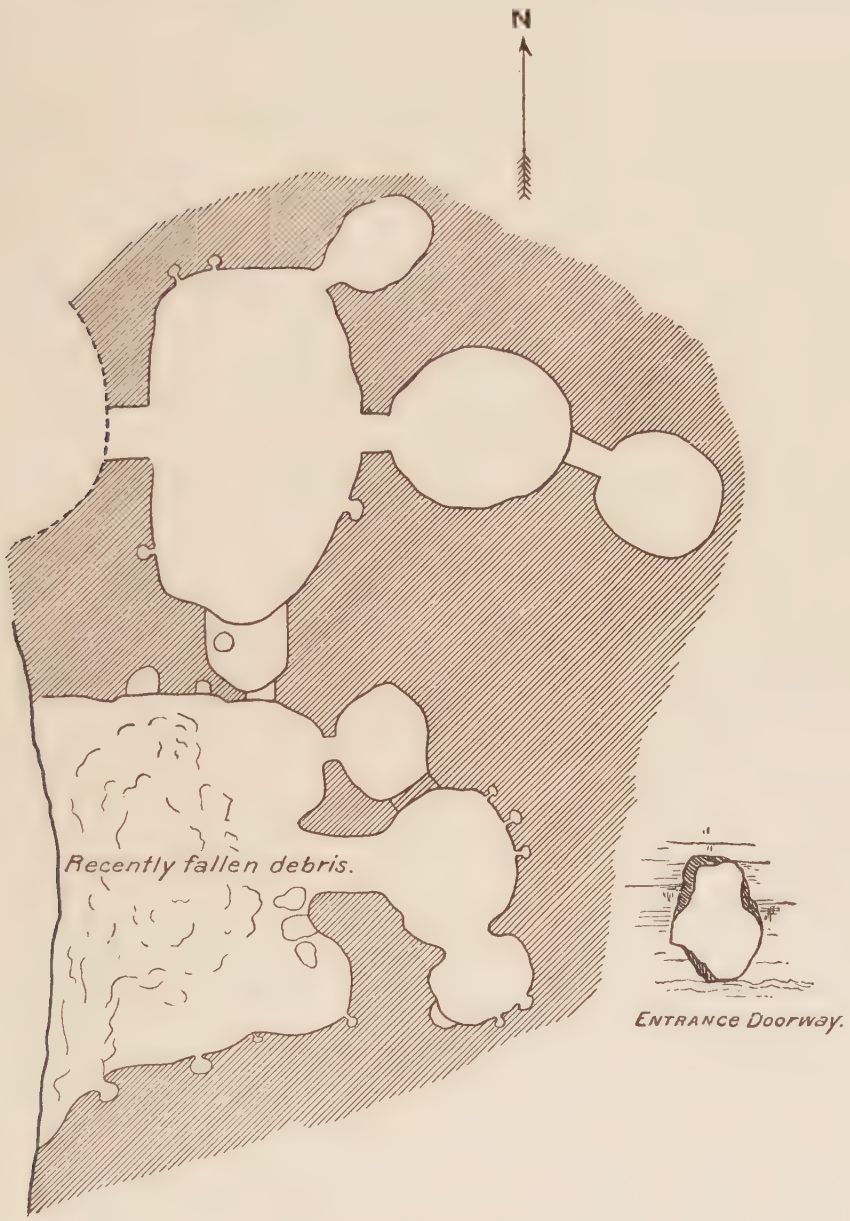


Fig. 298.—Plan of cavate lodges, group *C*.

and pockets in the wall which are characteristic of these lodges, and which are very numerous in all the principal groups, noticeably in the group next described.

At the point marked *C* on the map there is an elaborate group of chambers, consisting of two groups joined together and comprising altogether eight rooms. This is shown in plan in figure 298. The rock composing the front of the main room of the southern group has recently fallen, making a pile of débris about 4 feet high. The room originally measured about 12 by 22 feet. Its eastern side is occupied by a passageway leading into an adjoining chamber and by two shallow, roughly semicircular coves, apparently the remains of former small rooms. Along the northern wall of the room there are two little nooks at the floor level, and along the southern wall there are four, one of them (shown on the plan) being dug out like a pit. The roof of the room was about 6 feet above the floor.

The passageway near the eastern side is 4½ feet long, and is 3½ feet wide—an unusual width. It opens into a roughly circular room, 8 feet in diameter, but with a roof only 3½ feet above the floor. Along the northeastern side of this room there are three small pockets opening on the floor level. On the southern side of the room there is a wide opening into a small attached room, roughly oblong in shape and measuring about 6½ by 4½ feet. Along the southern wall of this little room there are two small pockets, and at the southwestern corner the rock has been cleared out to form a low cavity in the shape of a half dome. In the northwestern corner of the room there is another wide passage to a small room attached to the main room. This passage is now carefully sealed on its southern side with a slab of stone, plastered neatly so as to be hardly perceptible from the southern side. The room into which this passage opens on the north is attached to the northeastern corner of the main apartment by a narrow passage, 1½ feet wide and a foot long. It is roughly circular in shape, about 6 feet in diameter, and is the only chamber in the southern group which has no pockets or cubby-holes. Of these pockets there are no fewer than twelve in the southern group. Near the northern corner of the main room there is a doorway leading into a cove, which in turn opens into the main room of the northern group.

The main room of the northern group is set back about 9 feet from the face of the bluff, but is entered by a passageway about 3 feet long, the remainder of the distance consisting of a cove in the cliff. The room is 22 feet long and 13 feet wide and its roof is 6½ feet above the floor. In the southwestern corner there is a small pocket in the wall, and in the northwestern corner two others, all on the floor level. In the eastern side, however, there is a cubby-hole nearly 2 feet in diameter and about 2 feet above the floor. This is a rare feature. The southern end of the room opens into a kind of cove, raised 2 feet above the floor of the main room, and opening at its southern end into the main room of the southern group. In the floor of this cove there is a circular pit about 18 inches in diameter (marked in the plan, figure 298). Although resembling the fire holes already described, the position of

OLD DITCH NEAR VERDE, LOOKING WESTWARD.

the pit under consideration precludes use for that purpose; it was probably designed to contain water. At the northeastern corner of the principal apartment there is an oblong chamber or storage cist, measuring 6 feet by 7 feet.

Connected with the main room by a passageway 2 feet long cut in its eastern wall, there is an almost circular chamber 7 feet in diameter, and this in turn connects with another chamber beyond it by a passageway 2½ feet long and less than 2 feet wide. The roofs of the two chambers last mentioned are but 4½ and 4 feet, respectively, above the floor, and in none of the rooms of this group, except the main apartment, are pockets or niches found. The whole group extends back about 45 feet into the bluff.

BOWLDER-MARKED SITES.

Within the limits of the region here treated there are many hundreds of sites of structures and groups of rooms now marked only by lines of water-rounded bowlders. As a rule each site was occupied by only one or two rooms, although sometimes the settlement rose to the dignity of a village of considerable size. The rooms were nearly always oblong, similar in size and ground plan to the rooms composing the village ruins already described, but differing in two essential points, viz, character of site and character of the masonry. As a rule these remains are found on and generally near the edge of a low mesa or hill overlooking some area of tillable land, but they are by no means confined to such locations, being often found directly on the bottom land, still more frequently on the banks of dry washes at the points where they emerge from the hills, and sometimes on little islands or raised areas within the wash where every spring they must have been threatened with overflow or perhaps even overflowed. An examination of many sites leads to the conclusion that permanency was not an element of much weight in their selection.

Externally these bowlder-marked sites have every appearance of great antiquity, but all the evidence obtainable in regard to them indicates that they were connected with and inhabited at the same time as the other ruins in the region in which they are found. They are so much obliterated now, however, that a careful examination fails to determine in some cases whether the site in question was or was not occupied by a room or group of rooms, and there is a notable dearth of pottery fragments such as are so abundant in the ruins already described. Excavation in a large ruin of this type, however, conducted by some ranchmen living just above Limestone creek, yielded a considerable lot of pottery, not differing in kind from the fragments found in stone ruins so far as can be judged from description alone.

In the southern part of the region here treated bowlder-marked sites are more clearly marked and more easily distinguished than in the northern part, partly perhaps because in that section the normal ground

surface is smoother than in the northern section and affords a greater contrast with the site itself. Plate XXXIII shows one of these bowlder-marked sites which occurs a little below Limestone creek, on the opposite or eastern side of the river. It is typical of many in that district. It will be noticed that the bowlders are but slightly sunk into the soil, and that the surface of the ground has been so slightly disturbed that it is practically level; there is not enough débris on the ground to raise the walls 2 feet. The illustration shows, in the middle distance, a considerable area of bottom land which the site overlooks. In plan this site shows a number of oblong rectangular rooms, the longer axes of which are not always parallel, the plan resembling very closely the smaller stone village ruins already described. It is probable that the lack of parallelism in the longer axes of the rooms is due to the same cause as in the village ruins, i. e., to the fact that the site was not all built up at one time.

The illustration represents only a part of an extensive series of wall remains. The series commences at the northern end of a mesa forming the eastern boundary of the Rio Verde and a little below a point opposite the mouth of Limestone creek. The ruins occur along the western rim of the mesa, overlooking the river and the bottom lands on the other side, and are now marked only by bowlders and a slight rise in the ground. But few lines of wall are visible, most of the ruins consisting only of a few bowlders scattered without system. From the northern end of the mesa, where the ruins commence, traces of walls can be seen extending due southward and at an angle of about 10° with the mesa edge for a distance of one-fourth of a mile. Beyond this, for half a mile or more southward, remains of single houses and small clusters occur, and these are found in less abundance to the southern edge of the mesa, where the ruin illustrated occurs. The settlement extended some distance east of the part illustrated, and also southward on the slope of the hill. Two well-marked lines of wall occur at the foot of the hill, on the flat bottom land, but the slopes of the hill are covered with bowlders and show no well-defined lines. Scattered about on the surface of the ground are some fragments of metates of coarse black basalt and some potsherds, but the latter are not abundant.

The bowlders which now mark these sites were probably obtained in the immediate vicinity of the points where they were used. The mesa on which the ruin occurs is a river terrace, constructed partly of these bowlders; they outcrop occasionally on its surface and show clearly in its sloping sides, and the washes that carry off the water falling on its surface are full of them.

In the northern end of the settlement there are faint traces of what may have been an irrigating ditch, but the topography is such that water could not be brought on top of the mesa from the river itself. At the southern end of the settlement, northeast of the point shown in the illustration, there are traces of a structure that may have been a

OLD DITCH NEAR VERDE, LOOKING EASTWARD.

storage reservoir. The surface of the mesa dips slightly southward, and the reservoir-like structure is placed at a point just above the head of a large wash, where a considerable part of the water that falls upon the surface of the mesa could be caught. It is possible that, commencing at the northern end of the settlement, a ditch extended completely through it, terminating in the storage reservoir at the southern end, and that this ditch was used to collect the surface water and was not connected with the river. A method of irrigation similar to this is practiced today by some of the Pueblo Indians, notably by the Hopi or Tusayan and by the Zuñi. In the bottom land immediately south of the mesa, now occupied by several American families, there is a fine example of an aboriginal ditch, described later.

In the vicinity of the large ruin just above Limestone creek, previously described, the bowlder-marked sites are especially abundant. In the immediate vicinity of that ruin there are ten or more of them, and they are abundant all along the edge of the mesa forming the upper river terrace; in fact, they are found in every valley and on every point of mesa overlooking a valley containing tillable land.

It is probable that the bowlder-marked ruins are the sites of secondary and temporary structures, erected for convenience in working fields near to or overlooked by them and distant from the home pueblo. The character of the sites occupied by them and the plan of the structures themselves supports this hypothesis. That they were connected with the permanent stone villages is evident from their comparative abundance about each of the larger ones, and that they were constructed in a less substantial manner than the home pueblo is shown by the character of the remains.

It seems quite likely that only the lower course or courses of the walls of these dwellings were of bowlders, the superstructure being perhaps sometimes of earth (not adobe) but more probably often of the type known as "jacal"—upright slabs of wood plastered with mud. This method of construction was known to the ancient pueblo peoples and is used today to a considerable extent by the Mexican population of the southwest and to a less extent in some of the pueblos. No traces of this construction were found in the bowlder-marked sites, perhaps because no excavation was carried on; but it is evident that the rooms were not built of stone, and that not more than a small percentage could have been built of rammed earth or grout, as the latter, in disintegrating leaves well-defined mounds and lines of débris. It is improbable, moreover, that the structures were of brush plastered with mud, such as the Navajo hogan, as this method of construction is not well adapted to a rectangular ground plan, and if persistently applied would soon modify such a plan to a round or partially rounded one. Temporary brush structures would not require stone foundations, but structures composed of upright posts or slabs, filled in with brush and plastered with mud, and designed to last more

than one farming season, would probably be placed on stone foundations, as the soil throughout most of the region in which these remains occur is very light, and a wooden structure placed directly on it would hardly survive a winter.

In the valley of the Rio Verde the profitable use of adobe at the present time is approximately limited northward by the thirty-fourth parallel, which crosses the valley a little below the mouth of Limestone creek. North of this latitude adobe is used less and less and where used requires more and more attention to keep in order, although on the high tablelands some distance farther northward it is again a suitable construction. South of the thirty-fourth parallel, however, adobe construction is well suited to the climate and in the valleys of Salt and Gila rivers it is the standard construction. Adobe construction (the use of sun-dried molded brick) was unknown to the ancient pueblo builders, but its aboriginal counterpart, rammed earth or pisé construction, such as that of the well known Casa Grande ruin on Gila river, acted in much the same way under climatic influences, and it is probable that its lack of suitability precluded its use in the greater part of the Verde valley. No walls of the type of those of the Casa Grande ruin have been found in the valley of the Verde, although abundant in the valleys of the Salt and Gila rivers, but it is possible that this method of construction was used in the southern part of the Verde region for temporary structures; in the northern part of that region its use even for that purpose was not practicable.

In this connection it should be noted that all the ruins herein described are of buildings of the northern type of aboriginal pueblo architecture and seem to be connected with the north rather than the south.

IRRIGATING DITCHES AND HORTICULTURAL WORKS.

One of the finest examples of an aboriginal irrigating ditch that has come under the writer's notice occurs about 2 miles below the mouth of Limestone creek, on the opposite or eastern side of the river. At this point there is a large area of fertile bottom land, now occupied by some half dozen ranches, known locally as the Lower Verde settlement. The ditch extends across the northern and western part of this area. Plate XXXIV shows a portion of this ditch at a point about one-eighth of a mile east of the river. Here the ditch is marked by a very shallow trough in the grass-covered bottom, bounded on either side by a low ridge of earth and pebbles. Plate XXXV shows the same ditch at a point about one-eighth of a mile above the last, where it was necessary to cut through a low ridge. North of this point the ditch can not be traced, but here it is about 40 feet above the river and about 10 feet above a modern (American) ditch. It is probable that the water was taken out of the river about 2 miles above this place, but the ditch was run on the sloping side of the mesa which has been recently

BLUFF OVER ANCIENT DITCH, SHOWING GRAVEL STRATUM.

washed out. No traces of the ditch were found east of the point shown in plate XXXIV, but as the modern acequia, which enters the valley nearly 10 feet below the ancient one, extends up the valley nearly to its head, there is no reason to suppose that the ancient ditch did not irrigate nearly the whole area of bottom land. The ancient ditch is well marked by two clearly defined lines of pebbles and small bowlders, as shown in the illustration. Probably these pebbles entered into its construction, as the modern ditch, washed out at its head and abandoned more than a year ago, shows no trace of a similar marking.

A little west and south of the point shown in plate XXXIV the bottom land drops off by a low bench of 3 or 4 feet to a lower level or terrace, and this edge is marked for a distance of about a quarter of a mile by the remains of a stone wall or other analogous structure. This is located on the extreme edge of the upper bench and it is marked on its higher side by a very small elevation. On the outer or lower side it is more clearly visible, as the stones of which the wall was composed are scattered over the slope marking the edge of the upper bench. At irregular intervals along the

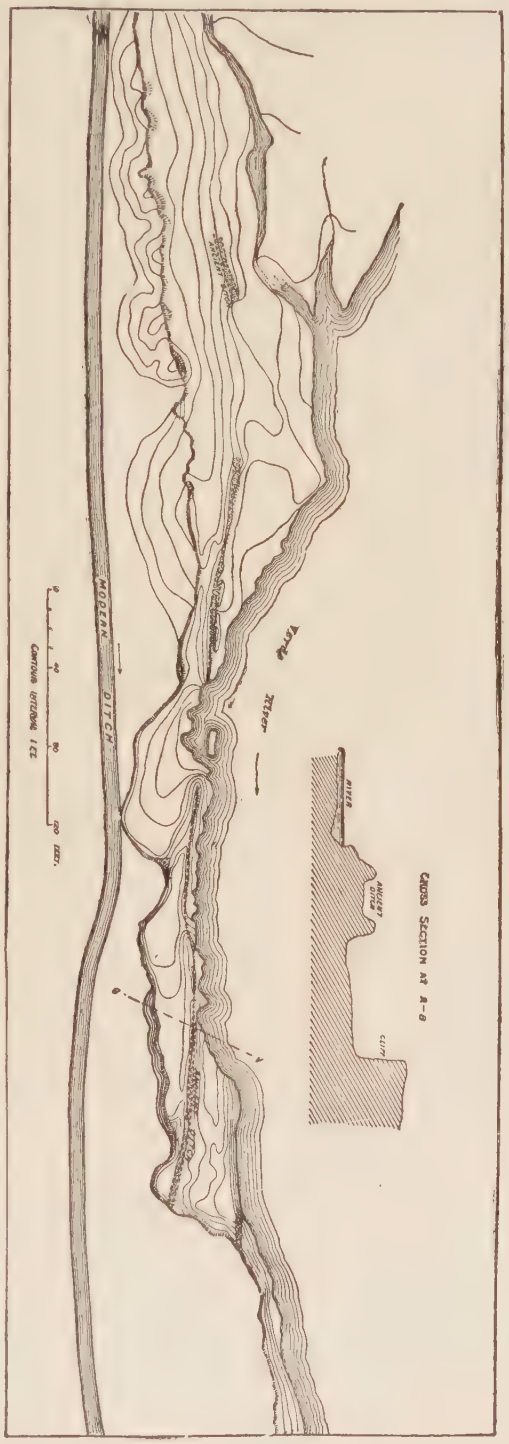


FIG. 299.—Map of an ancient irrigating ditch.

wall there are distinct rectangular areas about the size of an ordinary pueblo room, i.e., about 8 by 10 and 10 by 12 feet.

In February, 1891, there was an exceptional flood in Verde river due to prolonged hard rain. The river in some places rose nearly 20 feet, and at many points washed away its banks and changed the channel. The river rose on two occasions; during its first rise it cut away a considerable section of the bank near a point known as Spanish wash, about 3½ miles below Verde, exposing an ancient ditch. During its second rise it cut away still more of the bank and part of the ancient ditch exposed a few days before. The river here makes a sharp bend and flows a little north of east. The modern American ditch, which supplied all the bottom lands of the Verde west of the river, was ruined in this vicinity by the flood that uncovered the old ditch. Figure 299 is a map of the ancient ditch drawn in the field, with contours a foot apart, and showing also a section, on a somewhat larger scale, drawn through the points *A B* on the map. Plate XXXVI is a view of the ditch looking westward across the point where it has been washed away, and plate XXXVII shows the eastern portion, where the ditch disappears under the bluff.

The bank of the river at this point consists of a low sandy beach, from 10 to 50 feet wide, limited on the south by a vertical bluff 10 to 12 feet high and composed of sandy alluvial soil. This bluff is the edge of the bottom land before referred to, and on top is almost flat and covered with a growth of mesquite, some of the trees reaching a diameter of more than 3 inches. The American ditch, which is shown on the map, runs along the top of the bluff skirting its edge, and is about 14 feet above the river at its ordinary stage. The edge of the bluff is shown on the map by a heavy black line. It will be observed that the ancient ditch occurs on the lower flat, about 3 feet above the river at its ordinary stage, and its remains extend over nearly 500 feet. The line, however, is not a straight one, but has several decided bends. One of these occurs at a point just west of that shown in the section. About 80 feet east of that point the ditch makes another turn southward, and about 40 feet beyond strikes the face of the bluff almost at right angles and passes under it.

About 50 feet north of the main ditch, at the point where it passes under the bluff, there are the remains of another ditch, as shown on the map. This second ditch was about a foot higher than the main structure, or about 4 feet above the river; it runs nearly parallel with it for 30 feet and then passes into the bluff with a slight turn toward the north. It is about the same size as the main ditch, but its section is more evenly rounded. Figure 300 shows this ditch in section.

As already stated, the American ditch is about 14 feet above the river, while the ancient ditch is less than 4 feet above the water. This decided difference in level indicates a marked difference in the character of the river. The destruction of the modern ditch by the flood of

ANCIENT DITCH AND HORTICULTURAL WORKS ON CLEAR CREEK.

1891 is not the first mishap of that kind which has befallen the settlers. The ditch immediately preceding the current one passed nearly over the center of the ancient ditch, then covered by 10 feet or more of alluvial soil, and if a ditch were placed today on the level of the ancient structure it would certainly be destroyed every spring. The water that flowed through the modern ditch was taken from the river at a point about 3 miles farther northward, or just below Verde. The water for the ancient ditch must have been taken out less than a mile above the southern end of the section shown in the map.

At first sight it would appear that the ancient ditch antedated the deposit of alluvial soil forming the bottom land at this point, and this

FIG. 300.—Part of old irrigating ditch.

hypothesis is supported by several facts of importance. It is said that ten years ago the bottom land, whose edge now forms the bluff referred to, extended some 25 or 30 feet farther out, and that the river then flowed in a channel some 200 or 300 feet north of the present one. Be this as it may, the bottom land now presents a fairly continuous surface, from the banks of the river to the foothills that limit the valley on the west and south, and it is certain that this bottom land extended over the place occupied by the ancient ditch; nor is it to be supposed that the ancient ditches ended abruptly at the point where they now enter the bluff. The curves in the line of the ancient ditch might indicate that it was constructed along the slope of a hill, or on an uneven

surface, as a deep excavation in fairly even ground would naturally be made in a straight line.

The face of the bluff shows an even deposit of sand, without apparent stratification, except here and there a thin layer or facing of mud occurs, such as covers the bottom of the ancient ditch and also of the modern ditch. Singularly enough, however, over the ancient ditch, about 5 feet above its bottom, there is a stratum of sand and gravel, and on top, within a few inches of the surface of the ground, a thin stratum of mud. This mud stratum extends only about 8 feet horizontally and is slightly hollowed, with its lowest part over the center of the ditch. The gravel stratum also was laid down over the ditch, is tilted slightly southward and occurs in two layers, together about a foot thick. It first appears a few feet south of the point where the main ditch enters the bluff and over the ditch both layers are distinctly marked, as shown in plate XXXVIII. Both layers are clearly marked to a distance of 4 feet north of the northern side of the main ditch; here the lower layer thins out, but the upper layer continues faintly marked almost to the edge of the small ditch. At this point the gravel stratum becomes pronounced again and continues over the small ditch, almost pure gravel in places, with a decided dip westward. At a point just beyond the northern side of the small ditch the gravel layer disappears entirely.

The occurrence of this gravel in the way described seems to indicate that the ditch was built along the slope of a low hill forming the edge of the bottom land at that time, and that subsequently detritus was deposited above it and over the adjacent bottom land forming a smooth ground surface. Against this hypothesis it must be stated that no evidence whatever was found of more than a single deposit of sandy loam, although the exposures are good; but perhaps were an examination made by a competent geologist some such evidence might be developed.

There is one fact that should not be lost sight of in the discussion, viz, the very low elevation of the ditch above the river. The Verde is, as already stated, a typical mountain stream, with an exceptionally high declivity, and consequently it is rapidly lowering its bed. If, as already conjectured, the water for the ancient ditch was taken from the river but a short distance above the point where remains of the ditch are now found—and this assumption seems well supported by the character of the adjacent topography—the slight elevation of the bed of the ditch above the river would indicate that, in the first place, the ditch was located, as already suggested, along the slope of a hill, and in the second place, that the ditch was built at a period of no great antiquity. The occurrence of the high bluff under which the ditch now passes does not conflict with this suggestion, for the deposition of the material composing it and its erosion into its present form and condition may be the result of decades rather than of centuries of work by

ANCIENT DITCH AROUND A KNOLL, CLEAR CREEK.

a stream like the Verde, and certainly a hundred, or at most a hundred and fifty years would suffice to accomplish it. At the present time a few floods deposit an amount of material equal to that under discussion, and if subsequently the river changed its channel, as it does at a dozen different points every spring, a few decades only would be required to cover the surface with grass and bushes, and in short, to form a bottom land similar to that now existing over the ancient ditch.

In conclusion it should be noted, in support of the hypothesis that the ditch was built before the material composing the bluff was laid down, that immediately under the ditch there is a stratum of hard adobe-like earth, quite different from the sand above it and from the material of which the bluff is composed. This stratum is shown clearly in plate XXXVIII.

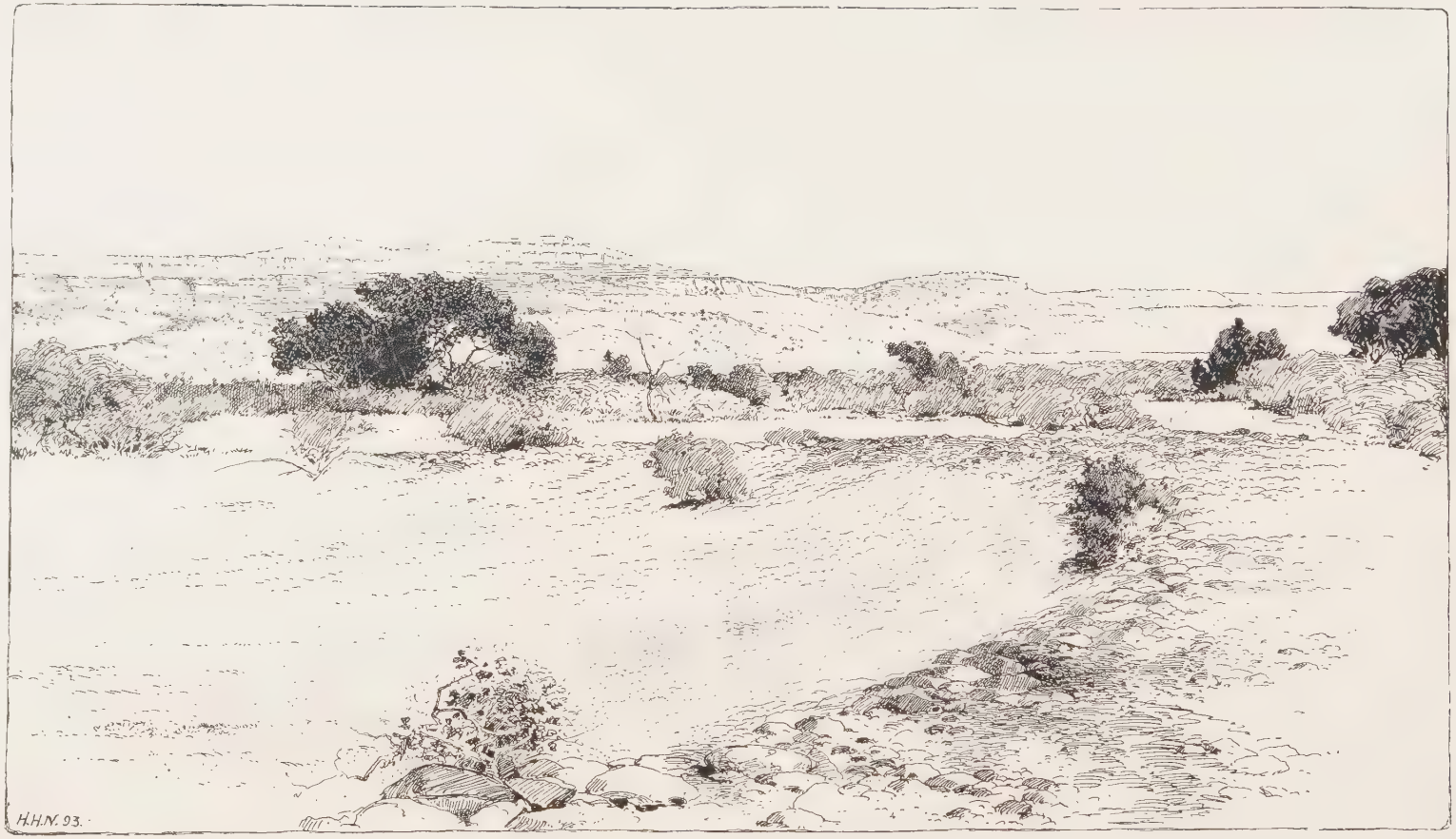
The hypothesis which accords best with the evidence now in hand is that which assumes that the ditch was taken out of the river but a short distance above the point illustrated, and that it was built on the slope of a low hill, or on a nearly flat undulating bottom land, before the material composing the present bottom or river terrace was deposited, and that the ditch, while it may be of considerable antiquity, is not necessarily more than a hundred or a hundred and fifty years old; in other words, we may reach a fairly definite determination of its minimum but not of its maximum antiquity.

On the southern side of Clear creek, about a mile above its mouth, there are extensive horticultural works covering a large area of the terrace or river bench. These have already been alluded to in the description of the village ruin overlooking them, but there are several features which are worthy a more detailed description. For a distance of 2 miles east and west along the creek, and perhaps half a mile north and south, there are traces of former works pertaining to horticulture, including irrigating ditches, "reservoirs," farming outlooks, etc.

At the eastern end of these works, about 3 miles above the mouth of Clear creek, the main ditch, after running along the slope of the hill for some distance, comes out on top of the mesa or terrace nearly opposite the Morris place. The water was taken from the creek but a short distance above, hardly more than half a mile. West of the point where the ditch comes out on the mesa top, all traces of it disappear, but they are found again at various points on the terrace. Plate XXXIX shows a portion of the terrace below and opposite the rectangular ruin previously described. In the distant foreground the light line indicates a part of the ancient ditch. Plate XL shows the same ditch at a point half a mile below the last, where it rounds a knoll. In the distance is the flat-topped hill or mesa on which the rectangular ruin previously described is located. About a hundred yards southeast of this point further traces of the ditch may be seen, and connected with it at that point are a number of rectangular areas, which were cultivated patches when the ditch was in use.

The whole surface of the terrace within the limits described is covered by small water-worn bowlders scattered so thickly over it that travel is seriously impeded. In many parts of it these bowlders are arranged so as to inclose small rectangular areas, and these areas are connected with the old ditch just described. Plate XXXIX shows something of this surface character; and in the right hand portion of it may be seen some of the rows of bowlders forming the rectangular areas. The rows which occur at right angles to the ditch are much more clearly marked than those parallel to it, and the longer axes of the rectangular areas are usually also at right angles to the ditch line. On the ground these traces of inclosures can hardly be made out, but from an elevated point, such as the mesa on which the rectangular ruin overlooking these works is located, they show very clearly and have the appearance of windrows. Traces of these horticultural works would be more numerous, and doubtless more distinct, were it not that a considerable part of the area formerly under cultivation has been picked over by the modern settlers in this region, and immense quantities of stone have been removed and used in the construction of fences. This has not been done, however, in such a manner as to leave the ground entirely bare, yet bare areas occur here and there over the surface, where doubtless once existed a part of the general scheme of horticultural works.

One such bare area occurs close to the edge of the terrace about a mile and a half above the mouth of the creek. In its center is a structure called for convenience a reservoir, although it is by no means certain that it was used as such. It occurs about 100 yards from the creek, opposite the Wingfield place, and consists of a depression surrounded by an elevated rim. It is oval, measuring 108 feet north and south and 72 feet east and west from rim to rim. The crown of the rim is 5 feet 8 inches above the bottom of the depression and about 3 feet above the ground outside. The rim is fairly continuous, except at points on the northern and southern sides, where there are slight depressions, and these depressions are further marked by extra large bowlders. At its lowest points, however, the rim is over 2 feet above the ground, which slopes away from it for some distance in every direction. Plate XLI shows the eastern side of the depression; the large tree in the middle distance is on the bank of Clear creek and below the terrace. Plate XLII shows the northern gateway or dip in the rim, looking southward across the depression. The large bowlders previously referred to can be clearly seen. A depression similar to this occurs on the opposite side of the valley, about half a mile from the river. In this case it is not marked by bowlders or stones of any description, but is smooth and rounded, corresponding to the surface of the ground in its vicinity. In the latter as in the former case, the depression occurs on a low knoll or swell in the bottom land, and the surface of the ground slopes gently away from it for some distance in every direction.



ANCIENT WORK ON CLEAR CREEK.

The purpose of these depressions is not at all clear, and although popularly known as reservoirs it is hardly possible that they were used as such. The capacity of the Clear creek depression is about 160,000 gallons, or when two-thirds full, which would be the limit of its working capacity, about 100,000 gallons. The minimum rate of evaporation in this region in the winter months is over 3 inches per month, rising in summer to 10 inches or more, so that in winter the loss of water stored in this depression would be about 10,000 gallons a month, while in summer it might be as high as 35,000 or even 40,000 gallons a month. It follows, therefore, that even if the reservoir were filled to its full working capacity in winter and early spring it would be impossible to hold the water for more than two months and retain enough at the end of that time to make storing worth while. It has been already stated, however, that these depressions are situated on slight knolls and that the land falls away from them in every direction. As no surface drainage could be led into them, and as there is no trace on the ground of a raised ditch discharging into them, they must have been filled, if used as reservoirs, from the rain which fell within the line that circumscribes them. The mean annual rainfall (for over seventeen years) at Verde, a few miles farther northward in the same valley, is 11·44 inches, with a maximum annual fall of 27·27 inches and a minimum of 4·80 inches. The mean annual fall (for over twenty-one years) at Fort McDowell, near the mouth of the Rio Verde, is 10·54 inches, with a maximum of 20·0 inches and a minimum of 4·94 inches.[1]

If these depressions were used as reservoirs it is a fair presumption that the bottoms were plastered with clay, so that there would be no seepage and the only loss would be by evaporation. Yet this loss, in a dry and windy climate such as that of the region here treated, would be sufficient to render impracticable a storage reservoir of a cross section and a site like the one under discussion. Most of the rainfall is in the winter months, from December to March, and it would require a fall of over 12 inches during those months to render the reservoir of any use in June; it would certainly be of no use in July and August, at the time when water is most needed, save in exceptional years with rainfall much in excess of the mean.

On the other hand, there is the hypothesis that these depressions represent house structures; but if so these structures are anomalous in this region. The contour of the ground does not support the idea of a cluster of rooms about a central court, nor does the débris bear it out. Mr. F. H. Cushing has found depressions in the valleys of Salt and Gila rivers somewhat resembling these in form and measurement, and situated always on the outskirts of the sites of villages. Excavations were made, and as the result of these he came to the conclusion that

[1]Report on Rainfall (Pacific coast and western states and territories), Signal Office U. S. War Dept., Senate Ex. Doc. 91, 50th Cong., 1st Sess., Washington, 1889; pp. 70–73 (Errata, p. 4).

the depressions were the remains of large council chambers, as the floors were hard, plastered with mud, and dish-shaped, with a fire-hole in the center of each; and no pottery or implements or remains of any kind were found except a number of "sitting stones." Mr. Cushing found traces of upright logs which formed the outer wall of the structure; he inferred from the absence of drainage channels that the structure was roofed, and as the ordinary method of roofing is impracticable on the scale of these structures, he supposed that a method similar to that used by the Pima Indians in roofing their granaries was employed, the roof being of a flattened dome shape and composed of grass or reeds, formed in a continuous coil and covered with earth. If the depressions under discussion, however, are the remains of structures such as these described, they form a curious anomaly in this region, for, as has been already stated, the affinities of the remains of this region are with the northern architectural types, and not at all with those of the southern.

There is a third hypothesis which, though not supported by direct evidence, seems plausible. It is that the depression of Clear creek, and perhaps also the one on the opposite side of the Verde, were thrashing floors. This hypothesis accords well with the situation of these depressions upon the tillable bottom lands, and with their relation to the other remains in their vicinity; and their depth below the surface of the ground would be accounted for, under the assumption here made of their use, by the high and almost continuous winds of the summer in this region. Perhaps the slight depressions at the northern and southern side of the oval were the gateways through which the animals which trampled the straw or the men who worked the flails passed in and out. Whether used in this way or not, these depressions would be, under the assumption that the bottom was plastered with mud, not only practicable, but even desirable thrashing floors, as the grain would be subjected during thrashing to a partial winnowing. This suggestion would also account for the comparatively clean ground surface about the depressions and for their location on slightly elevated knolls.

Scattered over the whole area formerly under cultivation along Clear creek are the remains of small, single rooms, well marked on the ground, but without any standing wall remaining. These remains are scattered indiscriminately over the terrace without system or arrangement; they are sometimes on the flat, sometimes on slight knolls. They number altogether perhaps forty or fifty. Plate XLIII shows an example which occurs on a low knoll, shown also in plate XL; it is typical of these remains. It will be noticed that the masonry was composed of river bowlders not dressed or prepared in any way, and that the débris on the ground would raise the walls scarcely to the height of a single low story.

The location of these remains, their relation to other remains in the vicinity, and their character all support the conclusion that they were

GATEWAY TO ANCIENT WORK, CLEAR CREEK.

small temporary shelters or farming outlooks, occupied only during the season when the fields about them were cultivated and during the gathering of the harvest, as is the case with analogous structures used in the farming operations among the pueblos of to-day. Their number and distribution do not necessarily signify that all the terrace was under cultivation at one time, although there is a fair presumption that the larger part of it was, and the occurrence of the ditch at both the upper and the lower ends of the area strengthens this conclusion.

As it is impossible that an area so large as this should be cultivated by the inhabitants of one village, it is probable that a number of villages combined in the use of this terrace for their horticultural operations; and, reasoning from what we know to have been the case in other regions, it is further probable that this combination resulted in endless contention and strife, and perhaps finally to the abandonment of these fields if not of this region. The rectangular ruin already illustrated is situated on a hill south of the terrace and overlooks it from that direction; on the opposite side of Clear creek, on the hill bounding the valley on the north, there are the remains of a large stone village which commanded an outlook over the terraces in question; and a little farther up the creek, on the same side and similarly situated, there was another village which also overlooked them. There were doubtless other villages and small settlements whose remains are not now clearly distinguishable, and it is quite probable that some of the inhabitants of the large villages in the vicinity, like those near Verde, hardly 3 miles northward, had a few farming houses and some land under cultivation on this terrace.

Thus it will be seen that there was no lack of cultivators for all the tillable land on the terrace, and there is no reason to suppose that the period when the land was under cultivation, and the period when the villages overlooking it were occupied, were not identical, and that the single-house remains scattered over the terrace were not built and occupied at the same period. The relation of the stone villages to the area formerly cultivated, the relation of the single-room remains to the area immediately about them, the character of the remains, and the known methods of horticulture followed by the Pueblo Indians, all support the conclusion that these remains were not only contemporaneous but also related to one another.

STRUCTURAL CHARACTERISTICS.

MASONRY AND OTHER DETAILS.

The masonry of the stone villages throughout all the region here treated is of the same type, although there are some variations. It does not compare with the fine work found on the San Juan and its tributaries, although belonging to that type—the walls being composed of two faces with rubble filling, and the interstices of the large stones being filled or chinked with spalls. This chinking is more pronounced and better done in the northern part of the region than in the south.

The rock employed depended in all cases on the immediate environments of the site of the village, the walls being composed in some cases of slabs of limestone, in other cases of river bowlders only, and in still others of both in combination. The walls of the large ruin near Limestone creek were composed of rude slabs of limestone with an intermixture of bowlders. The bowlders usually occur only in the lower part of the wall, near the ground, and in several cases, where nothing exists of the wall above the surface of the ground, the remains consist entirely of bowlders. A good example of this peculiarity of construction is shown in plate XLIV, and plate LXV shows the character of stone employed and also a section of standing wall on the western side of the village. A section of standing wall near the center of the ruin is illustrated in plate XIII. It will be noticed that some of the walls shown in this illustration are chinked, but to a very slight extent. The wall represented in plate XLV has slabs of limestone set on edge. This feature is found also in other ruins in this region, notably in those opposite Verde, though it seems to be more used in the south than in the north. An example occurring in the ruin opposite Verde is shown in plate XLVI. In this case chinking is more pronounced; the walls are from 2 to 2½ feet thick, built in the ordinary way with two faces and an interior filling, but the stones are large and the filling is almost wholly adobe mortar. The two faces are tied together by extra long stones which occasionally project into the back of one or the other face.

The western cluster of the ruin last mentioned, shown on the ground plan (plate XVII), has almost all its walls still standing, and the masonry, while of the same general character as that of the main cluster, is better executed. The stones composing the walls are smaller than those in the main cluster and more uniform in size, and the interstices are carefully chinked. The chinking is distinctive in that spalls were not used, but more or less flattened river pebbles. The different color and texture of these pebbles make them stand out from the wall distinctly, giving quite an ornamental effect.

SINGLE-ROOM REMAINS ON CLEAR CREEK.

That portion of the standing wall of the ruin opposite Verde, which occurs in the saddle northeastward from the main cluster, shown on the plan in plate XVII, represents the best masonry found in this region. As elsewhere stated, this was probably the last part of the village to be built. These walls are shown in plate XLVII. It will be noticed that the stones are of very irregular shape, rendering a considerable amount of chinking necessary to produce even a fair result, and that the stones are exceptionally large. The masonry of this village is characterized by the use of stones larger than common, many of them being larger than one man can carry and some of them even larger than two men can handle.

All the larger and more important ruins of this region are constructed of limestone slabs, sometimes with bowlders. The smaller ruins, on the other hand, were built usually of river bowlders, sometimes with an intermixture of slabs of limestone and sandstone but with a decided preponderance of river bowlders. This would seem to suggest that this region was gradually populated, and that the larger structures were the last ones built. This suggestion has been already made in the discussion of the ground plans, and it is, moreover, in accord with the history of the pueblo-builders farther northward, notably that of the Hopi.

Plate XXI illustrates a type of bowlder masonry which occurs on Clear creek; plate XLVIII shows the masonry of the ruin at the mouth of the East Verde, and plate XVI shows that of a ruin at the mouth of Fossil creek. In all these examples the stone composing the walls was derived either from the bed of an adjacent stream or from the ground on which they were built, and was used without any preparation whatever; yet in the better examples of this type of masonry a fairly good result was obtained by a careful selection of the stones. A still ruder type of masonry sometimes found in connection with village ruins is shown in figure 290. This, however, was used only as in the example illustrated, for retaining walls to trails or terraces, or analogous structures.

In a general way it may be stated that the masonry of the village ruins of this region is much inferior to that of the San Juan region, and in its rough and unfinished surfaces, in the use of an inferior material close at hand rather than a better material a short distance away, and in the ignorance on the part of the builders of many constructive devices and expedients employed in the best examples of pueblo masonry, the work of this region may be ranked with that of the Tusayan—in other words, at the lower end of the scale.

There is but little masonry about the cavate lodges, and that is rude in character, As elsewhere stated, walled fronts are exceptional in this region, and where they occur the work was done very roughly. Figure 301 shows an example that occurs in the group of cavate lodges already described. It will be noticed that little selection has been exercised in the stones employed, and that an excess of mortar has

been used to fill in the large interstices. Figure 290 (p. 221), which shows a storage cist attached to the group of cavate lodges, marked *D* on the map (plate XXV), exhibits the same excessive use of adobe or mud plastering. At several other points in the area shown on this map there are short walls, sometimes inside the lodges, sometimes outside. In

FIG. 301.—Walled front cavate lodges.

all cases, however, they are rudely constructed and heavily plastered with mud; in short, the masonry of the cavate lodges exhibits an ignorance fully equal to that of the stone villages, while the execution is, if anything, ruder. It is singular that, notwithstanding the excessive use of mud mortar and mud plastering in the few walls that are found there, such plastering was almost never used on the walls in the

BOWLDER FOUNDATIONS NEAR LIMESTONE CREEK.

interiors of the lodges, perhaps because no finer finish than the rough surface of the rock was considered desirable.

The cavate lodges seem to have been excavated without the aid of other tools than a rough maul or a piece of stone held in the hand, and such a tool is well adapted to the work, since a blow on the surface of the rock is sufficient to bring off large slabs. Notwithstanding the rude tools and methods, however, some of the work is quite neat, especially in the passageways (which are often 3 or 4 feet long and quite narrow) and in the smaller chambers. In the excavation of these chambers benches were left at convenient places along the wall and niches and cubby-holes were cut, so that in the best examples of cavate lodges the occupants, it would seem, were more comfortable, so far as regards their habitation, than the ordinary Pueblo Indian of today, and better supplied with the conveniences of that method of living. It should be stated in this connection, however, that although the group of cavate lodges gives an example of an extensive work well carried out, the successful carrying out of that work does not imply either a large population or a high degree of skill; the only thing necessary was time, and the amount of time necessary for the work is not nearly so great, in proportion to the population housed, as was required for the better types of pueblo work in the San Juan country (the village ruins of the Chaco canyon for example), and probably no more than would be required for the construction of rooms of equal size and of the rather poor grade of work found in this region.

Although no examples of interior wall-plastering were found in the group of cavate lodges described, such work has been found in neighboring lodges; and in this group plastered floors are quite common. The object of plastering the floors was to secure a fairly even surface such as the soft rock did not provide, and this was secured not by the application of layers of clay but by the use of clay here and there wherever needed to bring the surface up to a general level, and the whole surface was subsequently finished. This final finishing was sometimes omitted, and many floors are composed partly of the natural rock and partly of clay, the latter frequently in spots and areas of small size.

The floors were often divided into a number of sections by low ridges of clay, sometimes 8 inches broad. These ridges are shown on the ground plans (figures 294 to 298, and in plate XXV). Their purpose is not clear, although it can readily be seen that in such domestic operations as sorting grain they would be useful.

DOOR AND WINDOW OPENINGS.

The masonry of this region was so roughly and carelessly executed that little evidence remains in the stone villages of such details of construction as door and window openings. Destruction of the walls seems to have commenced at these openings, and while there are

numerous standing walls, some with a height of over 10 feet, no perfect example of a door or window opening was found. It is probable that the methods employed were similar or analogous to those used today by the Hopi, and that the wooden lintel and stone jamb was the standard type.

In the cavate lodges window openings are not found; there is but one opening, the doorway, and this is of a pronounced and peculiar type.

FIG. 302.—Bowlders in footway, cavate lodges

As a rule these doorways are wider at the top than at the bottom and there are no corners, the opening roughly approximating the shape of a pear with the smaller end downward. The upper part of the opening consists always of the naked rock, but the lower part is generally

MASONRY OF RUIN NEAR LIMESTONE CREEK.

framed with slabs of sandstone. Plate XLIX shows an example that occurs in the upper tier of lodges at its eastern end. The floor of this

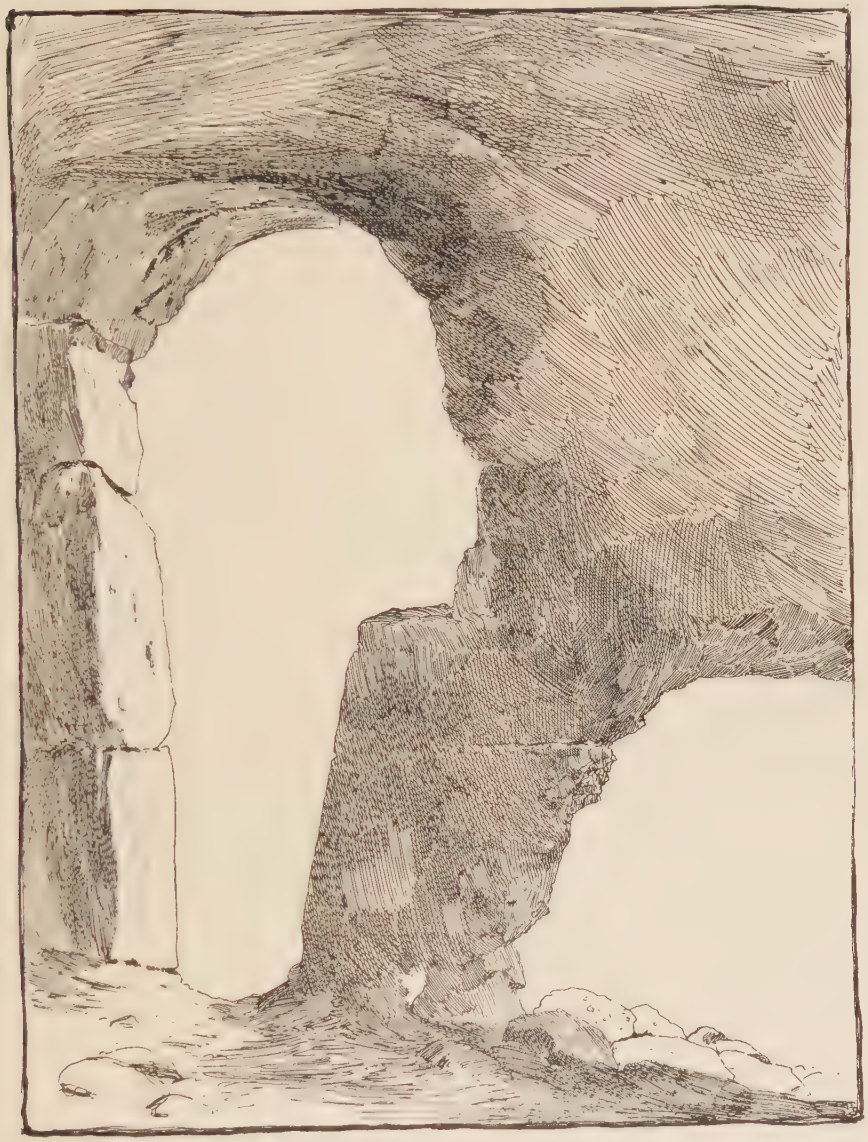


FIG. 303.—Framed doorway, cavate lodges.

lodge is about 2 feet above the bench from which it was entered, and this specimen fails to show a feature which is very common in this group —a line of water-worn bowlders extending from the exterior to the interior of the lodges through the doorway and arranged like stepping stones. This feature is shown in figure 302, which represents the doorway of group *E*, shown on the general map (plate XXV) and on the detailed

plan, figure 297. Figure 303 shows a type in which the framing is extended up on one side nearly to the top, while on the other side it extends only to half the height of the opening, which above the framing is hollowed out to increase its width. This example occurs near that shown in plate XLIX, and the floor of the chamber is raised about 2 feet above the bench from which it is entered. The illustration gives a view from the interior, looking out, and the large opening on the right was caused by the comparatively recent breaking out of the wall. Figure 303 shows the doorway to the group of chambers marked *E* on the general map, an interior view of which is shown in figure 302. In this example the obvious object of the framing was to reduce the size of the opening, and to accomplish this the slabs were set out 10 or 12 inches from the rock forming the sides of the opening, and the intervening space was filled in with rubble. Plate XXXII, which shows the interior of the main room in group *D*, shows also the large doorway on the north.

It will be noticed that these doorways all conform to one general plan and that this plan required an opening considerably larger in its upper third than in the lower two-thirds of its height. This requirement seems to be the counterpart or analogue of the notched doorway, which is the standard type in the cliff ruins of Canyon de Chelly and other regions, and still very common in Tusayan (Moki). Figure 304 shows a notched doorway in Canyon de Chelly and figure 305 gives an example of the same type of opening in Tusayan. The object of this peculiar shape in the regions mentioned has been well established,[1] and there is no reason to suppose that similar conditions and a similar object would not produce a similar result here. This type of opening had its origin in the time when the pueblo builders had no means, other than blankets, of temporarily closing door openings and when all the supplies of the village were brought in on the backs of the inhabitants. In order to secure protection against cold and storm the opening was made of the smallest possible size consistent with its use, and the upper part of the opening was made larger in order to permit the introduction of back loads of faggots and other necessaries. This purpose would be almost as well served by the openings of the cavate lodges as by the notched doorway, and at the same time the smallest possible opening was exposed to the weather. The two types of openings seem

FIG. 304.—Notched doorway in Canyon de Chelly.

[1] A Study of Pueblo Architecture, by Victor Mindeleff: 8th. Ann. Rep. Bur. Eth. for 1886–1887; Washington, 1891, pp. 1–228.

MASONRY OF RUIN OPPOSITE VERDE.

simply to be two different methods of accomplishing the same purpose—one in solid rock, the other in masonry. That it was considered desirable to reduce the openings as much as possible is evident from the employment of framing slabs in the lower portions, reducing the width of that part generally to less than a foot, while the upper portions are usually 3 feet and more in width, and the absence of framing slabs in the upper part of the openings was probably due to their use as suggested; no slabs could be attached with sufficient firmness to resist the drag of a back load of wood, for example, forced between them. The strict confinement of door openings to one type suggests a short, rather than a long, occupancy of the site under discussion, a suggestion which is

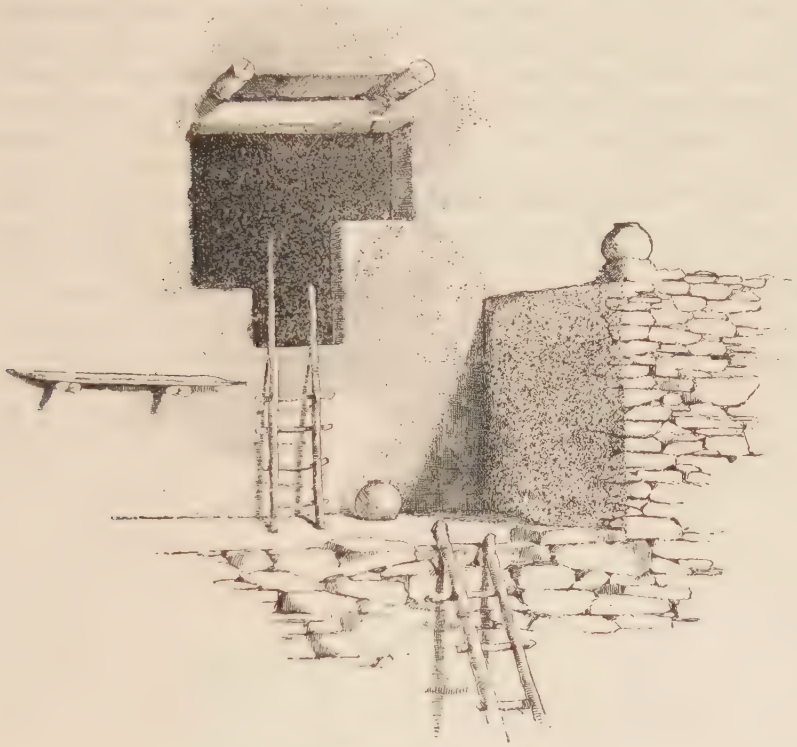


FIG. 305.—Notched doorway in Tusayan.

borne out by other details; and this unity of design renders it difficult to form a conclusion as to the relative age of the two types of openings under discussion. So far as the evidence goes, however, it supports the conclusion that the doorways of the cavate lodges were derived from a type previously developed, and that the idea has been modified and to some extent adapted to a different environment; for if the idea had been developed in the cavate lodges there would be a much greater number of variations than we find in fact. There can be

no doubt, however, that the cavate lodge doorways represent an earlier type in development, if not in time, than the notched doorways of Tusayan.

CHIMNEYS AND FIREPLACES.

Nowhere in the village ruins or in the cavate lodges of the lower Verde were any traces of chimneys or other artificial smoke exits found. The village ruins are too much broken down to permit definite statement of the means employed for smoke exits, but had the inhabitants employed such exits as are in use in the pueblos today some evidence of them would remain. Probably there was no other exit than the door, and perhaps trapdoors or small openings in the roofs, such as were formerly employed in the inhabited pueblos, according to their traditions. In the cavate lodges no exit other than the door was possible, and many of them are found with their walls much blackened by smoke.

The fireplaces or fire holes of the cavate lodges have already been alluded to, and one of the best examples found is illustrated in plate XXXII, and the location of a number of others is shown on the general plan. These fireplaces are located not in the center of the chamber, but near the principal doorway, and doubtless the object of this location was to facilitate the escape of the smoke. Fire holes were never located in interior rooms. The fireplace illustrated in plate XXXII has been already described (p. 227); it was excavated in the solid rock of the floor and was lined with fragments of pottery laid in mud mortar as closely as their shape would permit. A part of this pottery lining can be seen in the illustration. When the room was cleared out the fire hole was found to be about half full of fine ashes.

STANDING WALLS OPPOSITE VERDE.

CONCLUSIONS.

The ruins of the lower Verde valley represent a comparatively late period in the history of the Pueblo tribes. The period of occupancy was not a long one and the population was never large, probably not exceeding at any time 800 or 1,000 souls, possibly less than 700; nor were the dwellings in that region all occupied at the same time.

There is no essential difference, other than those due to immediate environment, between the architecture of the lower Verde region and that of the more primitive types found in other regions, Tusayan for example. The Verde architecture is, however, of a more purely aboriginal type than that of any modern pueblo, and the absence of introduced or foreign ideas is its chief characteristic. There are no chimneys, no adobe walls, no constructive expedients other than aboriginal and rather primitive ones. The absence of circular kivas[1] or sacred council chambers is noteworthy.

The circular kiva is a survival of an ancient type—a survival supported by all the power of religious feeling and the conservatism in religious matters characteristic of savage and barbarous life; and while most of the modern pueblos have at the present time rectangular kivas, such, for example, as those at Tusayan, at Zuñi, and at Acoma, there is no doubt that the circular form is the more primitive and was formerly used by some tribes which now have only the rectangular form. Still the abandonment of the circular and the adoption of the rectangular form, due to expediency and the breaking down of old traditions, was a very gradual process and proceeded at a different rate in different parts of the country. At the time of the Spanish conquest the prevailing form in the old province of Cibola was rectangular, although the circular kiva was not entirely absent; while, on the other hand, in the cliff ruins of Canyon de Chelly, whose date is partly subsequent to the sixteenth century, the circular kiva is the prevailing, if not the exclusive form. But notwithstanding this the Hopi Indians of Tusayan, to whom many of the Canyon de Chelly ruins are to be attributed, today have not a single circular kiva. The reason for this radical departure from the old type is a simple one, and to be found in the single term environment. The savage is truly a child of nature and almost completely under its sway. A slight difference in the geologic formations of two regions will produce a difference in the arts of the inhabitants of those

[1] As this term has been already defined, it is here used without further explanation. For a full discussion of these structures, see "A Study of Pueblo Architecture," by Victor Mindeleff, in 8th Ann. Rep. Bur. Eth., 1886-87, Washington, 1891.

regions, provided the occupancy be a long one. In the case of the Tusayan kivas the rectangular form was imposed on the builders by the character of the sites they occupied. The requirement that the kiva should be under ground, or partly under ground, was a more stringent one than that it should be circular, and with the rude appliances at their command the Tusayan builders could accomplish practically nothing unless they utilized natural cracks and fissures in the rocks. Hence the abandonment of the circular form and also of the more essential requirement, that the kiva should be inclosed within the walls of the village or within a court; the Tusayan kivas are located indiscriminately in the courts and on the outskirts of the village, wherever a suitable site was found, some of them being placed at a considerable distance from the nearest house.

It will be seen, therefore, that it is impossible to base any chronologic conclusions on the presence or absence of this feature, notwithstanding the undoubted priority of the circular form, except in so far as these conclusions are limited to some certain region or known tribal stock. If it be assumed that the Verde ruins belong to the Tusayan, and all the evidence in hand favors that assumption, the conclusion follows that they should be assigned to a comparatively late period in the history of that tribe.

That the period of occupancy of the lower Verde valley was not a long one is proved by the character of the remains and by what we know of the history of the pueblo-building tribes. There are no very large areas of tillable land on the lower Verde and not a large number of small ones, and aside from these areas the country is arid and forbidding in the extreme. Such a country would be occupied only as a last resort, or temporarily during the course of a migration. The term migration, however, must not be taken in the sense in which it has been applied to European stocks, a movement of people en masse or in several large groups. Migration as used here, and as it generally applies to the Pueblo Indians, means a slow gradual movement, generally without any definite and ultimate end in view. A small section of a village, generally a gens or a subgens, moves away from the parent village, perhaps only a few miles. At another time another section moves to another site, at still another time another section moves, and so on. These movements are not possible where outside hostile pressure is strong, and if such pressure is long continued it results in a reaggregation of the various scattered settlements into one large village. Such in brief is the process which is termed migration, and which has covered the southwest with thousands of village ruins. Of course larger movements have occurred and whole villages have been abandoned in a day, but as a rule the abandonment of villages was a gradual process often consuming years.

Before the archeologic investigation of the pueblo region commenced and when there was little knowledge extant by which travelers could

MASONRY OF RUIN AT MOUTH OF THE EAST VERDE.

check their conclusions, the immense number of ruins in that region was commonly attributed to an immense population, some writers placing the number as high as 500,000. Beside this figure the present population, about 9,000, is so insignificant that it is hardly surprising that the ancient and modern villages were separated and attributed to different tribal stocks.

The process briefly sketched above explains the way in which village ruins have their origin; a band of 500 village-building Indians might leave the ruins of fifty villages in the course of a single century. It is very doubtful whether the total number of Pueblo Indians ever exceeded 30,000. This is the figure stated by Mr. A. F. Bandelier, whose intimate acquaintance with the eastern part of the pueblo region gives his opinion great weight. The apparently trifling causes which sometimes result in the abandonment of villages have been already alluded to.

The lower Verde forms no exception to the general rule sketched above. Scattered along the river, and always located on or immediately adjacent to some area of tillable land, are found many small ruins, typical examples of which have been described in detail. These form the subordinate settlements whose place in the general scheme has been indicated. The masonry is generally of river bowlders only, not dressed or prepared in any way. The number of these settlements is no greater than would be required for one complete cycle or period, although the evidence seems to support the hypothesis that the movement commenced in the northern part of the region and proceeded southward in two or perhaps three separate steps. It is possible, however, that the movement was in the other direction. This question can be settled only by a thorough examination of the regions to the north and south.

There are two, possibly three, points in the region discussed where a stand was made and the various minor settlements were abandoned, the inhabitants congregating into larger bands and building a larger village for better defense against the common foe. These are located at the extreme northern and southern limits of the region treated, opposite Verde and near Limestone creek, and possibly also at an intermediate point, the limestone ruin above Fossil creek. These more important ruins are all built of limestone slabs, and the sites are carefully selected. The internal evidence supports the conclusion that the movement was southward and that in the large ruin near Limestone creek the inhabitants of the lower Verde valley had their last resting place before they were absorbed by the population south of them, or were driven permanently from this region. The strong resemblance of the ground plan of this village to that of Zuñi has been already commented on, and it is known that Zuñi was produced in the way stated, by the inhabitants of the famous "seven cities of Cibola," except that in this case Zuñi was the second site adopted, the aggregation into one village, or more properly a number of villages on one site, having taken place a few years before. The fact that Zuñi dates only

from the beginning of the last century should not be lost sight of in this discussion.

The inhabitants of the Verde valley were an agricultural people, and even in the darkest days of their history, when they were compelled to abandon the minor settlements, they still relied on horticulture for subsistence, and to a certain extent the defense motive was subordinated to the requirements of this method of life. There can be no doubt that the hostile pressure which produced the larger villages was Indian, probably the Apache and Walapai, who were in undisputed possession at the time of the American advent, and but little doubt that this pressure consisted not of regular invasions and set sieges, but of sudden raids and descents upon the fields, resulting in the carrying off of the produce and the killing of the producers. Such raids were often made by the Navajo on Tusayan, Zuñi, and the eastern pueblos and on the Mexican villages along the Rio Grande for some years after the American occupation, and are continued even today in a small way on the Tusayan. The effect of such raids is cumulative, and it might be several years before important action would result on the part of the village Indians subjected to them. On the other hand, several long seasons might elapse during which comparative immunity would be enjoyed by the village. In the lower Verde there is evidence of two such periods, if not more, and during that time the small pueblos and settlements previously referred to were built. None of these small settlements was occupied, however, for more than a few decades, the ground plans of most of them indicating an even shorter period.

That cavate lodges and cliff-dwellings are simply varieties of the same phase of life, and that life an agricultural one, is a conclusion supported by the remains in the lower Verde valley. The almost entire absence of cliff-dwellings and the great abundance of cavate lodges has already been commented on, and as the geologic formations are favorable to the latter, and unfavorable to the former on the Verde, whereas the Canyon de Chelly, where there are hundreds of cliff-dwellings and no cavate lodges, the conditions are reversed, this abundance of cavate lodges may be set down as due to an accident of environment. The cavate lodge of the Rio Verde is a more easily constructed and more convenient habitation than the cliff-dwelling of Canyon de Chelly.

An examination and survey of the cliff ruins of Canyon de Chelly, made some years ago by the writer, revealed the fact that they were always located with reference to some area of adjacent tillable land and that the defensive motive exercised so small an influence on the selection of the site and the character of the buildings that it could be ignored. It was found that the cliff-dwellings were merely farming outlooks, and that the villages proper were almost always located on the canyon bottom. With slight modifications these conclusions may be extended over the Verde region and applied to the cavate lodges there.

DOORWAY TO CAVATE LODGE

DOORWAY TO CAVATE LODGE.

The relation of these lodges to the village ruins and the character of the sites occupied by them support the conclusion that they were farming outlooks, probably occupied only during the farming season, according to the methods followed by many of the Pueblos today, and that the defensive motive had little or no influence on the selection of the site or the character of the structures. The bowlder-marked sites and the small single-room remains illustrate other phases of the same horticultural methods; methods somewhat resembling the "intensive culture," of modern agriculture, but requiring further a close supervision or watching of the crop during the period of ripening. As the area of tillable land in the pueblo region, especially in its western part, is limited, these requirements have developed a class of temporary structures, occupied only during the farming season. In Tusayan, where the most primitive architecture of the pueblo type is found, these structures are generally of brush; in Cañyon de Chelly they are cliff-dwellings; on the Rio Verde they are cavate lodges, bowlder-marked sites and single house remains; but at Zuñi they have reached their highest development in the three summer villages of Ojo Caliente, Nutria, and Pescado.

Since the American occupancy of the country and the consequent removal of the hostile pressure which has kept the Pueblo tribes in check, development has been rapid and now threatens a speedy extinction of pueblo life. The old Laguna has been abandoned, Acoma is being depopulated, the summer pueblos of Zuñi are now occupied all the year round by half a dozen or more families, and even in Tusayan, the most conservative of all the pueblo groups, the abandonment of the home village and location in more convenient single houses has commenced. It is the old process over again, but with the difference that formerly the cycle was completed by the reaggregation of the various families, and little bands into larger groups under hostile pressure from wilder tribes, but now that pressure has been permanently removed, and in a few years, or at most in a few generations, the old pueblo life will be known only by its records.

OMAHA DWELLINGS, FURNITURE, AND IMPLEMENTS

BY

JAMES OWEN DORSEY

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OMAHA DWELLINGS, FURNITURE, AND IMPLEMENTS

By James Owen Dorsey

INTRODUCTORY NOTE.

The accompanying paper is one of the results of personal investigations among the Omaha of Nebraska and cognate tribes of Indians, beginning in 1878 and continued from time to time during late years.

While the paper treats of the Omaha tribe, much that is said is applicable to the Ponka, as the two tribes have long had similar environments and a common dialect, for, until 1877, their habitats were almost contiguous, and since 1880 about one-third of the Ponka tribe has been dwelling on its former reservation near the town of Niobrara, Nebraska.

Acknowledgments are due Dr. O. T. Mason for many valuable suggestions early in the progress of the work.

DWELLINGS.

The primitive domiciles of the Omaha were chiefly (1) lodges of earth or, more rarely, of bark or mats, and (2) skin lodges or tents. It may be observed that there were no sacred rites connected with the earth lodge-building or tent-making among the Omaha and Ponka.

Earth Lodges.

When earth lodges were built, the people did not make them in a tribal circle, each man erecting his lodge where he wished; yet kindred commonly built near one another.

The earth lodges were made by the women, and were intended principally for summer use, when the people were not migrating or going on the hunt. Those built by the Omaha and Ponka were constructed in the following manner: The roof was supported by two series of vertical posts, forked at the top for the reception of the transverse connecting pieces of each series. The number in each series varied according to the size of the lodge; for a small lodge only four posts were erected in the inner series, for an ordinary lodge eight were required, and ten generally constituted the maximum. When Mr. Say[1] visited

[1] James' account of Long's Expedition to the Rocky Mountains in 1819–'20.

the Kansa Indians, he occupied a lodge in which twelve of these posts placed in a circle formed the outer series, and eight longer ones constituted the inner series, also describing a circle. The wall was formed by setting upright slabs of wood back of the outer posts all around the circumference of the lodge. These slabs were not over 6 feet in height, and their tops met the cross timbers on which the willow posts rested. Stocks of hard willow about 2 inches in diameter rested with their butts on the tops of the upright slabs and extended on the cross timbers nearly to the summit. These poles were very numerous, touching one another and extending all around in a radiating manner, supporting the roof like rafters. The rafters were covered with grass about a foot thick; and over the whole lodge, including the sides or slabs, earth was piled from a foot to 2 feet in depth. Such a covering lasted generally about twenty years. A hole in the middle served as an exit for the smoke.

FIG. 306.—Yellow Smoke's earth lodge.

In addition to the lodge proper there was a covered way about 10 feet long and 5 feet wide, the entrance to which had a covering of tanned or dried buffalo hides. This covering consisted of two hides hanging side by side, with the inner borders slightly overlapping. They were fastened to the passageway at the top and at the outer sides, but were loose at the bottom where they overlapped. This part was raised by a person entering the lodge. A similar covering was placed at the interior end of the passageway.

Subsequently to 1855, the Omaha dwelt in three villages composed of earth lodges, as follows: (1) Biku'de, a village near the agency; (2) Windja'ge, Standing Hawk's village, near the Presbyterian mission house; and (3) Ja^{n}¢a'te ("Wood Eaters," named after an insect found

under the bark of trees Sanssouci's village, near the town of Decatur, Nebraska.

Earth lodges were generally used for large gatherings, such as feasts, councils, or dances. Occasionally there was a depression in the center of the lodge which was used as a fireplace; but it was not over 6 inches deep. Each earth lodge had a ladder, made by cutting a series of deep notches along one side of a log. On a bluff near the Omaha agency I found the remains of several ancient earth lodges, with entrances on the southern sides. Two of these were 75 feet and one was 100 feet in diameter. In the center of the largest there was a hollow about 3 feet deep and nearly 4 feet below the surface outside the lodge.

Lodges of Bark or Mats.

The Omaha sometimes make bark lodges for summer occupancy, as did the Iowa and Sak. ⱡiu'ɸipu jiñ'ga, or low lodges covered with mats, were used by the Omaha in former days. Such lodges are still common among the Winnebago, the Osage, and other tribes. The ground plan of such a lodge forms an ellipse. The height is hardly over 7 feet from the ground. The tent poles are arranged thus: Each

Fig. 307.—Ground plan of Osage lodge.

pole has one end planted in the ground, the other end being bent down and fastened to the pole immediately opposite; a number of poles thus arranged in pairs formed both wall posts and rafters.

Generally there was one fireplace and one smokehole in such a lodge; but when I visited the Osage in 1883, I entered a low lodge with two fireplaces, each equidistant from its end of the lodge and the entrance, each fireplace having its smokehole.

Skin Lodges or Tents.

The tent was used when the people were migrating, and also when they were traveling in search of the buffalo. It was also the favorite abode of a household during the winter season, as the earth lodge was generally erected in an exposed situation, selected on account of comfort in the summer. The tent could be pitched in the timber or brush, or down in wooded ravines, where the cold winds never had full sweep. Hence, many Indians abandoned their houses in winter and went into their tents, even when they were of canvas.

The tent was commonly made of ten or a dozen dressed or tanned buffalo skins. It was in the shape of a sugar loaf, and was from 10 to

12 feet high, 10 or 15 feet in diameter at the bottom, and about a foot and a half in diameter at the top, which served as a smokehole (ɟihuɟaⁿ). Besides the interior tent poles (ɟici—3, figure 309) and the tent skin (ɟiha—1), the tent had the ɟiɸumaⁿhaⁿ, or the place where the skins were fastened together above the entrance (4). The ɟiɸumaⁿhaⁿ was fastened

FIG. 308.—Omaha tent (from a photograph by W. H. Jackson).

with the ɟihuɸubaxaⁿ(5), which consisted of sticks or pieces of hide thrust crosswise through the holes in the tent skins. The bottom of the tent was secured to the ground by pins (ɟihuɸugadaⁿ.—6) driven through holes (ɟihugaqɸuge) in the bottom of the skins, made when the latter were tanned and before they had become hard. The entrance (ɟijebe) was

generally opposite the quarter from which the wind was blowing. A door flap (ɟijebegɸa^{n}7—) hung over the entrance; it was made of skin with the hair outside, so as to turn water, and was held taut by a stick fastened to it transversely. The bottom of the door flap was loose, but the top was fastened to the tent.

The smokehole was formed by the two ɟihugabɸi^{n}ɸa (9), or triangular ends of tent skins, immediately above the entrance and ɟiɸuma^{n}ha^{n}. When there was no wind both of the ɟihugabɸi^{n}ɸa were kept open by means of the ɟihuɸubaji^{n} (8) or exterior tent poles, which were thrust through the ujiha, or small sacks, in the corners of the ɟihugabɸi^{n}ɸa. When the wind blew one of the ɟihuɸubaji^{n} was raised to the wind-

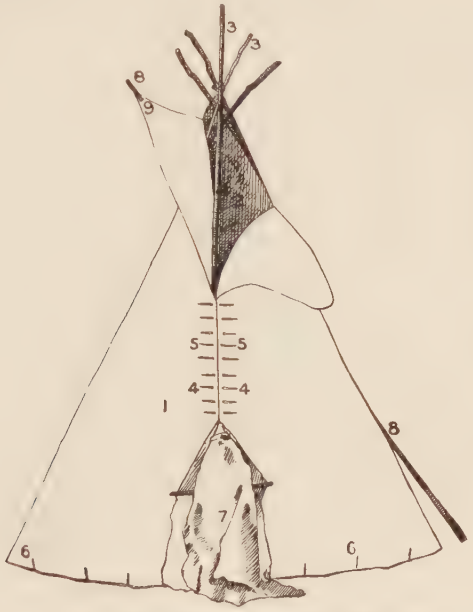


FIG. 309.—Exterior parts of an Omaha tent.

ward and the other was lowered, pulling its skin close to the tent and leaving an opening for the escape of the smoke; but if the wind came directly against the entrance both the flaps were raised, closing the smokehole to prevent the wind from blowing down it. When the wind blew the people used nandiɸagaspe to keep the bottom of each tent skin in place. These consisted of twisted grass, sticks, stones, or other heavy objects.

Figure 310 represents the tent of ɖejequde, an Omaha. The banners or standards, which were carried by the leaders of a war party or a party going on a dancing tour, are depicted with their decorations of strips of red and blue Indian cloth. Sometimes these standards were ornamented with feathers instead of with cloth. Each standard could be used in four war expeditions.

No totem posts were in use among the Omaha. The tent of the principal man of each gens was decorated on the outside with his gentile badge, which was painted on each side of the entrance as well as on the back of the tent.[1] The furniture of the sacred tents resembled that of the ordinary ones.

Before the introduction of canvas tents by the whites no needles or thread were used by the Siouan tribes. The women used sinew of the deer or buffalo instead of thread, and for needles they had awls made of elk horn.

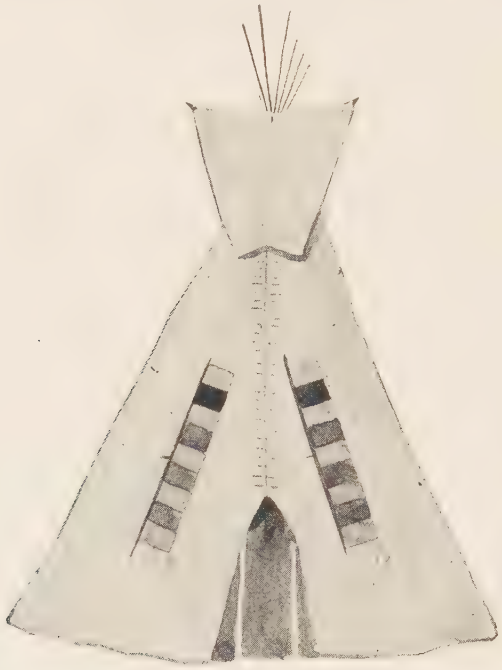


FIG. 310.—ɖejequde's tent.

Since there were no outbuildings, public granaries, or other structures of this description, each household stored away its own grain and other provisions. There were no special tribal or communal dwellings; but sometimes two or more households occupied a single earth lodge. When a council was held, it took place in the earth lodge of one of the head chiefs, or else two or three common tents were united, making one large one.[2] There were no public baths, as the Missouri river was near, and they could resort to it whenever they desired. Dance houses were improvised either of earth lodges or skin tents.

Sweat-lodges were in the form of low tents (ɟiuɸipu).[3] Stones were not boiled for the sweat-lodge, but were put into the fire to be heated. They were removed from the fire by means of sticks called iⁿᵏᵉ̆ basiɸaⁿ,

[1] Third Ann. Rep. Bur. Ethnology for 1882–'83, p. 230; also "A Study of Siouan Cults," in Eleventh Ann. Rep. Bur. Ethnology, 1889–'90, p. 351.

[2] Third Ann. Rep., op. cit., p. 294.

[3] Contributions to North American Ethnology, vol. vi, 1890, pp. 152, 169, and 234.

and then water from the kettle was poured on them, creating steam. Cedar fronds were dropped on the stones, causing a perfume to arise.

FURNITURE AND IMPLEMENTS.

Fireplaces.

Within the tent, in the center, was the fireplace (une¢ĕ), formed by excavating a small hollow. Beside this was erected a forked post (isag¢ĕ), on which was hung the apparatus for suspending a kettle over the fire. This apparatus was called ¢exe u¢ugacke by the Ponka, literally, "that by means of which the kettle is hung." The Omaha have two names for it, uha^{n} u¢ugacke, and u¢ugackeg¢e, the last syllable of the latter name referring to the attitude of the post. Around the fireplace was a circular space for the feet of the people as they sat about the fire. The couches of the occupants of the tent were arranged outside of and all around this circular space.

Beds and Bedding.

A couch was formed by laying down two or three winter hides dried with the hair on. These hides were placed around the fireplace at a safe distance. In the earth lodges, according to Joseph La Flèche, the Omaha used sahi, or grass mats, for seats, as is the present custom of the Winnebago; but at night they reclined on dressed hides with thick hair on them, and covered themselves with similar hides.

For pillows they used ibehi^{n} or i^{n}behi^{n}. When the vegetation was about 3 inches high in the spring, the Indians killed deer and pulled off the hair in order to remove the thin skin or tissue next to it. This latter, when thoroughly dried, is smooth and white, resembling parchment. It was used for pillows and moccasin-strings. When used for pillows the case was filled with goose feathers or the hair of the deer until it was about 2 feet long and 9 inches high. During the day, and whenever there was occasion, they were used as seats; but if none could be had, the people sat on winter robes or hides forming the couches.[1] Back of the couches and next to the interior tent-poles were placed the baggage, sacks of corn, and other household properties.

The upright tent is one form of the Dakota "wake′ya," the plural of which, "wake′yapi," undoubtedly gave rise to the familiar "wick′iup" of the plains, and also to "wä-ka′-yo" of Morgan.[2]

Cradles.

A board of convenient size, usually about a yard long and a foot wide, was selected to form a cradle or u¢uhe. No pillow was needed. A

[1] Hammocks and bedsteads were unknown prior to their introduction by the traders and other white people.

[2] Contributions to North American Ethnology, vol. iv., 1881, p. 114.

soft skin (đaqɸuqaha ɸa^{n}) covered with plenty of thick hair was laid on the board, and on it was placed the infant.

In the annexed figures, *a* is the ĭnduaϕisi^{n}ka^{n}he, the object painted on the board at the end where the infant's head is laid; *b* is the ĭnde-

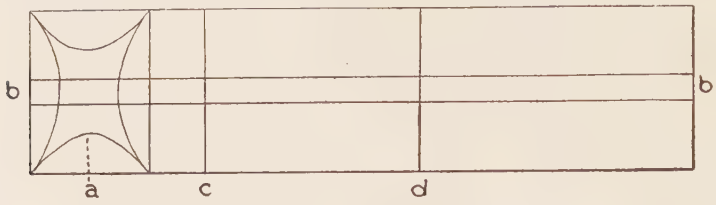


FIG. 311.—Omaha cradle—plan.

iϕidĭndi^{n} ("that which is drawn taut over the face"), the two strings of beads and sinew or thread (sometimes made of red calico alone), which keep in place the fan, etc.; the fan (ĭndeagani), which is suspended from a bow of wood, (*c*) is about 6 inches square, and is now

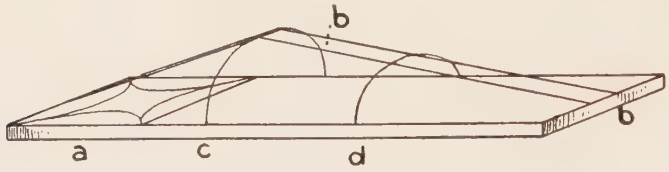


FIG. 312.—Omaha cradle—side view.

made of interwoven sinew on which beads have been strung. Occasionally thimbles and other bright objects dangle from the bottom of the fan. The iϕaϕistage (*d*) is the band by which the infant is fastened to the cradle.

CHILDREN'S SWINGS.

For swings the ends of two withes of buffalo hide were secured to four trees or posts which formed the corners of a parallelogram. A blanket was thrown across the withes and folded over on them. The infant was laid on top of the fold and swung from side to side without falling.

BROOMS.

Brooms were of two kinds. One form was made of sticks tied together, and was used for sweeping the ground outside of the tent or earth lodge, and the interior of the earth lodge, except the fireplace. The other kind was made of goose or turkey feathers, and was used for sweeping the fireplace of an earth lodge.

POTTERY.

Pottery has not been made by the Omaha for more than fifty years. The art of making it has been forgotten by the tribe.

MORTARS AND PESTLES.

A mortar was made by burning a large hole in a round knot or piece of wood about 7 inches in diameter. The lower end was sharpened

to a point, which was thrust into the ground when needed for use. After putting corn in a mortar of this description, the woman grasped the wooden pestle in the middle, with the larger end upward; the smaller end, which was about an inch in diameter, was put into the mortar. The operation of pounding corn among the Omaha was called "he." The mortar (uhe) and pestle (wehe) were both made commonly of elm, although sometimes they were fashioned of white oak. Mortars were of various sizes, some of them measuring 2 feet in diameter. Pestles were always of hard and heavy wood, and fully 3 feet long, tapering from 4 inches to an inch in diameter.

FIG. 314.—Omaha pestle.

FIG. 313.—Omaha mortar.

SPOONS, LADLES, AND DRINKING VESSELS.

Spoons were made of horn, wood, or pottery. The black spoons made of buffalo horn (ɻehe sabĕ), are not used by such Omaha as belong to the Buffalo gentes (Iñkesabĕ, ɸatada, ʟesinde, etc.) which may not touch a buffalo head. Other horn spoons of light color are made of cow horn. These are of modern origin. Wooden spoons (ja^{n}ɻehe) were made of knobs or knots of trees. Spoons made of buffalo horn are found among the Omaha and Ponka, but the Osage, Kansa, and Kwapa use clam shells (ɻihaba, in ɸegiha; tcühaba, tcühuba, in Kansa), so the Kansa call a small spoon, tcühaba jiñga. Spoons of buffalo horn had their handles variously ornamented by notches and other rude carving, often terminating in the head of a bird, the neck or handle of each being elevated at an angle of 50° or 60° with the bowl, which was about 3 inches in width by about 5 in length. As the handle of such a spoon usually terminates in a head or hook, it was impossible for it to slip into the bowl when the hook rested on the outside of the rim of the bowl.

Food was served in bowls of a very wide and simple form and of various sizes, generally carved out of large knots of wood. These served as drinking cups (ni'iɸáta^{n}), but now cups of tin or earthenware are used for that purpose.

WATER VESSELS.

When pottery was made, they used bowls and kettles. Some used wooden bowls of different sizes, the largest being about 2 feet in diameter. When they went on the hunt, they used the ínijeha (or sack made of the muscular coating of the buffalo paunch, by filling

with grass to make it stand out and keep its shape until dried). When the ínijeha was filled with water the mouth was tied, and it was kept covered and in the shade that it might remain cool. After being used for a few days it became strong smelling, and was thrown away, another taking its place. Some preferred the "ɻenăn'de uqɸa'ha ɸa^{n}" or pericardium (?) of the buffalo, which is like sinew. This does not smell unpleasant, even when used for seven or ten days. But at the expiration of that time it is unfit for further service.

Jugs have been introduced by the traders.

Other Vessels.

Provision sacks or parflèche cases were made of dried buffalo hide. When used for carrying the dried meat, they were called weábastá. After two or three years' use they became soft and were fit only for making moccasin soles. These sacks had the hair taken off, and were sometimes made in trunk fashion.

Fruit baskets were of three kinds. The Ponka made them of the bark of a tree, called tawá'a^{n}he, which is found on the old Ponka reservation in Dakota. Northern Indians make boats of this bark. The Omaha do not find the tree on their land, so they make the fruit baskets of other kinds of bark. The three kinds of baskets are as follows: Na^{n}'pa úɸisĕ, used for chokecherries; agɸañ'kamañge úɸisĕ, used for raspberries; and bact úɸisĕ, used for strawberries. When the Ponka wished to make the baskets, they stripped off the bark in horizontal sections, not pulling upward or downward.

In modern times the Omaha have learned to make sacks of thread of different colors drawn from black, red, blue, and white blankets. Different figures are woven. Each sack is about a foot deep, 16 inches from the mouth to the opposite side, and from 2 to 2½ feet long. The opening is on one of the long sides, and when the articles are put in a gathering string is drawn and tied.

Hoes and Axes.

For hoes, the Omaha used the shoulder blades of the buffalo. Axes and hatchets are now made of iron, hence, the Omaha name, ma^{n}'ze-pe, sharp iron. But the Kȧnsa have the ancient name, ma^{n}'hi-spe, answering to the Dakota, wa^{n}hi^{n}'-kpe, sharp flint. The hatchet is distinguished from the ax by adding "jiñga," small. Some of the stone axes and hatchets have been found on the Omaha reservation, but they could hardly have been used for cutting. It is not known what tools were used for felling trees.

Knives.

Knives were made of stone. A prominent butte, near the old Ponka agency, Nebraska, is known as "Máhi^{n}-ɻu," signifying blue knife, from the character of the stone with which its surface is covered. It is

several miles from the mouth of Ponka creek and nearly opposite the mouth of Choteau creek, South Dakota.

Implements Connected with Fire.

In former ages, the ɸegiha made fire by rubbing or turning a stick round and round between the hands. On the present Omaha reservation, and in that region, the Omaha use elm roots for that purpose. In the country called ɖizábahéhe, near the source of Elkhorn river, there is a grass known as "duáduáhi," which has about a hundred fine shoots from each root, which is half the size of the head. The stalk was used for hand drills and fire sticks. One stalk was cut almost flat, and the man puts his feet on the ends to steady them. Then, holding the other stick in his hands, with one end touching the stalk on the ground, he turned it round and round till the friction produced fire. Sometimes a small quantity of dry sand was placed on the flat stick. The same flat stick answered for several occasions. When the cavity made by turning the hand drill became too large, the point of contact was shifted to another part of the flat stick, and so on until the whole of that stick was used, when it was thrown away and another was obtained. Duáduáhi, according to Mr. Francis La Flesche, may be found in Judiciary square, Washington, District of Columbia. After the coming of the white man, but before the introduction of friction matches, which are now used by the whole tribe, the Omaha used flints and tinder for making fire.

Spits for roasting, etc., náqpe, or wébasnaⁿ, were made of any kind of wood.

For tongs they used the ɖediɸaɸisande ("fire-holder"), made by slitting one end of a stick. This implement was also called, jaⁿ jiñga nini ibista ("the stick that presses the fire against the tobacco"), because it was used for lighting pipes.

Smoking Paraphernalia.

The pipes in use among the Omaha are of three kinds: the sacred pipe (niniba waqube, mysterious pipe), including the war pipes and those used by the chiefs in making peace; the niniba weawaⁿ or

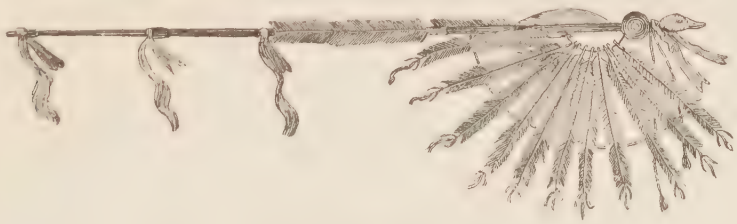


Fig. 315.—Omaha calumet

calumet (illustrated in figure 315), used in the calumet dance or dance of adoption,[1] and the hatchet pipe or maⁿzepe niniba, introduced since the coming of the white man. One form of the pipe used on ordinary

[1] See "Omaha Sociology," Third Ann. Rept. Bur. Ethnology, chap. vi.

occasions is shown in figure 316. This pipe has a bowl of catlinite, and the stem is decorated with horsehair.

Tobacco pouches (niniúǰiha) were made of deer or antelope skin, and were ornamented with porcupine quills or a fringe of deerskin. Some-

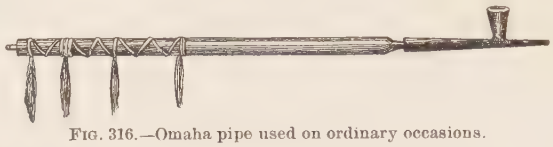


FIG. 316.—Omaha pipe used on ordinary occasions.

times buffalo bladders were used for this purpose. The women used them as receptacles for their porcupine quills.

EQUIPAGE FOR HORSES.

Saddles (cánakágɸe) were in use before the coming of the whites. They were made of wood, around which was wrapped hide, while still "ɻaha-nuɻa" (green or soft). According to Joseph La Flèche these saddles did not rub sores on the backs of the native horses (Indian ponies), but Dougherty[1] said, in 1819, "The Indians are generally cruel horse-masters, perhaps in a great measure through necessity; the backs of their horses are very often sore and ulcerated, from the friction of the rude saddle, which is fashioned after the Spanish manner, being elevated at the pummel and croup, and resting on skin saddle cloths without padding." They ride very well, and make frequent use of the whip and their heels, the latter being employed instead of spurs.

For bridles and halters they used strips of hide, out of which material they made also lariats. The bridle used consisted of a withe, one end of which was wrapped two or three times around the animal's lower jaw, while the other was held in the hand, forming but a single rein. This did not hinder the rider from guiding his horse, as he was able to turn him to the left by pressing the single rein against the animal's neck, as well as by the use of the right heel against its side. When he wished to turn to the right, he pulled the rein and pressed his left heel against the horse's side.

Whips were of three kinds. The waȟí wégasapi was attached to a bone handle. The handle of a jaⁿ'ukeɸiᵘ wégasapi was made of common wood. That of a zaᵘzí wégasapi was made of Osage orange wood, which is very hard. The whip was attached to the wrist by a broad band, which passed through a hole near the end of the handle. The handle was about 15 inches long and was very stout. A specimen that has been deposited in the National Museum (a gift to the author from an Omaha) has a lash 2 feet long, composed of 8 thongs one-fifth of an inch wide. These are plaited together in one rounded plait for 18 inches, the rest of the lash being in 2 plaits of 4 thongs each, knotted near the ends.

The lasso was called maⁿ'tanah-íɸize, i. e., "that by which (a) wild (horse) is taken." It was made by taking the hair from the head of

[1] Long, S. H.; Exp. Rocky Mts., vol. I, p. 291, Phila., 1823.

a buffalo and plaiting it into a very strong rope as thick as one's thumb. This rope was called "ɋaha-ɸisaⁿ," and was utilized by the Omaha and Ponka instead of the common lasso for catching wild horses in northwestern Nebraska. One end of the rope was formed into a noose large enough to slip over a horse's head, and the ends of this noose were secured to a long pole by small cords. The other end of the rope, arranged in a coil, was fastened to the belt or waist of the man. He rode with the pole held in one hand and tried to thrust the noose in front of a horse. When he succeeded in passing the noose over the head of an animal, he threw away the stick, which had become separated from the noose, and held the rope alone, which he pulled toward him. When the horse was caught, the man made an ĭndúɸiciⁿ (bridle or face cover), being careful to place some buffalo hair over the nose and under the chin, to guard against paining the horse, whose eyes remained uncovered.

Trappings for the saddle (sĭn'de-èhéɸě) were used. Some years ago a specimen of Omaha trapping was presented by the writer to the Anthropological Society of Washington, and subsequently was deposited in the National Museum.

Traveling Gear.

Snowshoes (sé-hiⁿbe) were worn by the Omaha and Ponka when they traversed a region north of their modern habitat.

For traveling on foot a staff (hí-mañgɸe) was used when it was necessary to pass over mountains; also when heavy loads had to be carried. This staff differed from the crutch (í-mañgɸe).

The women had mácaɋaⁿ, or straps, for aiding them in carrying loads of wood, etc.

Boats.

When they wished to cross streams they made hide boats, or mandéha. These were manufactured from dried buffalo hides, which were sewed together with sinew, and so tightly that no water could penetrate the seams. Ten branches of red willow were placed within, the ends being bent upward and fastened by withes to two other saplings, which extended the whole length of the boat at the inside of the gunwale. The ten pieces were the ɋíci-íkiđádaⁿ. The rudder or steering oar (íɸisaⁿ'ɸě) was fashioned like the oars (mandúɸugáhi), with the blade flat and of the breadth of two hands. The rowers (uɸúgahi aká) sat near the bow, and the steersman (ɸisaⁿ'ɸa aká) took his seat at the stern.

Musical Instruments.

Rattles were of five kinds. đexe were generally gourds; wataⁿ' đexe, gourd rattles, were always round, and were partially filled with seed, fine shot, or gravel. Ɫahánuɋa đéxe, green-hide rattles, were of two sorts, one of which is "ɸigúje," bent a little. Specimens of this form are in the National Museum.

Two kinds of rattles were called ɻa-cáge, i. e., "deers-claws," from the composition of one variety, though the other was made of molars of the elk.

The Omaha used three styles of drums. The ɸéxe-gaɻú bɸáska, or flat drum, is illustrated by a specimen (no. 21675) in the National Museum. The ɸéxe-gaɻú gadáje is made of buffalo hide, cowhide, or the skin of a horse. An example of this drum (no. 24682) is also in the National Museum, and is illustrated by the accompanying figure 317. The jaⁿ/ ɸéxe-gaɻú, or ɻúge ɸéxe-gaɻú, is a wooden or box drum, represented by the accompanying figure 318, also from a specimen (no. 58610) in the National Museum.

FIG. 317.—Skin drum.

Whistles were made of elder (baɻúci-hi, or popgun wood) by pushing out the pith. No holes were made in the sides of the tube.

Nisúde ɻañ'ga, or large flutes, were made of red cedar. A branch was cut off, rounded, split open with a knife, and hollowed out; then six holes were made in the side of one of them, and the halves were stuck together again. When one of these instruments is blown it produces quavering notes. The best specimens were made by ᗡáɸiⁿ-ɻañ'ga, Big Pawnee.

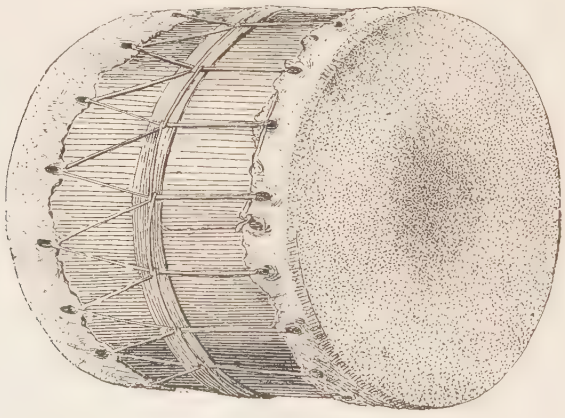


FIG. 318.—Box drum.

The large flute is illustrated in figure 319.[1] Wahí nisúde, or bone flutes, were made of the long bones from the eagle wing. These small flutes have only one hole. Reed flutes, ɸíqɸe nisúde, were made of a kind of reed which grows south of the Omaha territory, probably in

[1] Compare Ree fife, "AMM 129-8429, Gray and Matthews," in the National Museum.

Kansas. The Omaha obtained the reeds from some of the southern tribes and made them into flutes having but one hole each.

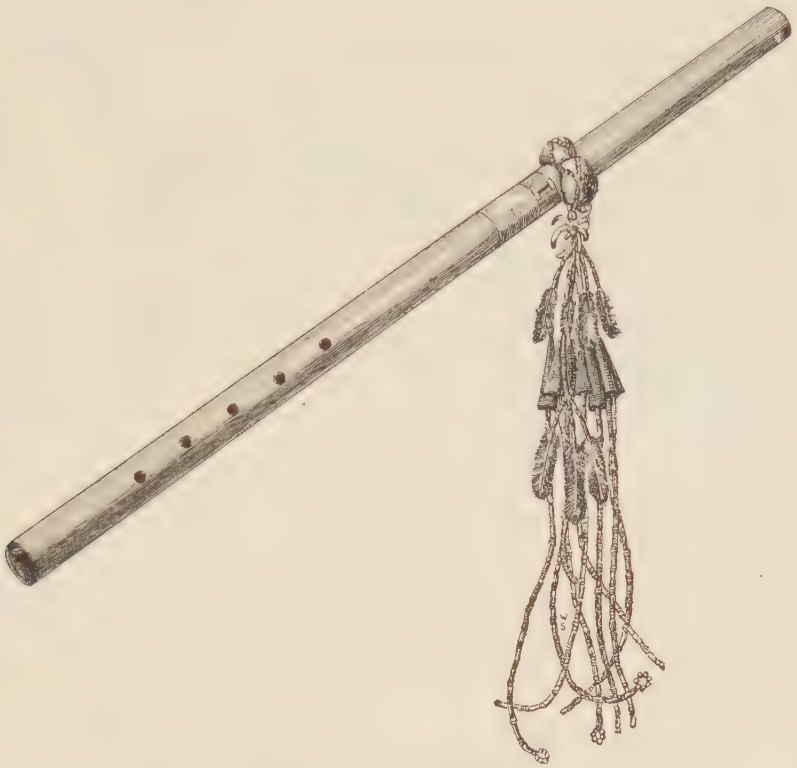


FIG. 319.—Omaha large flute.

WEAPONS.

CLUBS.

The ja^{n}-wéti^{n}, "striking-wood," is a four-sided club. It is made of ash, and is as long as from the elbow to the tips of the fingers. The ja^{n}-dáɔna, "wood with a smooth head," is a club made of ironwood,

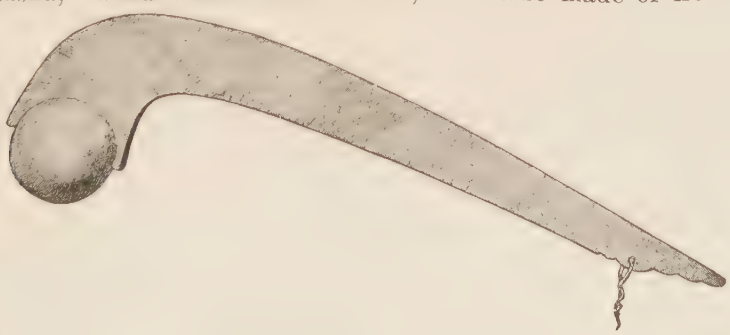


FIG. 320.—Omaha club (ja^{n}-dáɔna).

which is very hard. According to the late Joseph La Flèche, the Omaha form of this weapon had a steel point projecting from the ball.

Figures 320 and 321 are forms of the ja^{n}-đáɔna which may be seen in the National Museum (nos. 2649 and 22419). The weaq¢ade, another kind of war club, is made of some kind of hard wood. There are two varieties, one of which is shown in figure 322 (National Museum no. 23729). The other has a ball carved at the end of a straight handle, with a wooden

FIG. 321.—Omaha club (ja^{n}-đáɔna).

point (of one piece with the ball and handle) projecting from the ball, making an angle of about 130° with one side of the handle. There is a steel point inserted in the ball, forming an angle of about 110° with the

FIG. 322.—Omaha club (weaq¢ade).

other side of the handle. The i^{n}/-wate-jiñ′ga is something like a slung shot. A round stone is wrapped in a piece of hide which is fastened to a wooden handle about 2 feet long.

TOMAHAWKS.

The heads of tomahawks as well as of battle-axes were at first made of stone; but within the last century and a half they have been fashioned of iron.

SPEARS.

Lances, darts, or spears are designated by the general term man′dĕhi. The ja^{n}/-man′dĕhi are made of ash, and are from 6 to 8 feet long. There

are two kinds, of one of which the handle is round, and about an inch in diameter, and the point is flat and about the width of three fingers at its juncture with the handle.

Besides these there are the lances, called waq¢exe-¢ázɔ, of which there are two varieties. One consists of a straight pole, which has been thrust through a piece of buffalo hide that has its long end sewed together, forming a sort of covering. To this hide are fastened feathers of the crow and mi^{n}'xa-sa^{n}, or swan, in alternate rows or bunches. Between the feathers are fastened square pieces of blanket. About the middle of the pole a space of nearly 6 inches is left without feathers, and this is the place where the spear is grasped. When the pole was not set into a metal point the lower end was cut very sharp.[1] The other variety, or mandĕhi ¢iguje, "bent spear," is the weapon which the Dakota call "wahukeza." It is ornamented with eagle feathers placed at intevals, one being at the end of the curved part; and it generally terminates at the bottom in an iron point. It is possible for one of these waq¢exe¢aze to reach a man about 6 feet distant; and even mounted men have been killed by them. Spears are used also in some of the dances. Around the shaft is wrapped the skin of a swan or brant. The end feather at the top is white; the other feathers are white or spotted. The bent spear is no longer employed by the Omaha, though the Osage, Pawnee, and other tribes still use it to a greater or lesser extent.

Bows.

Bows (man-dĕ) are of two kinds. One is the man-dĕ or za^{n}zi-mandĕ (bow-wood bow), having an unbroken curve past the grip to within an

FIG. 323.—Omaha bow (za^{n}zi-mandĕ).

inch or two of each nock.[2] The other kind is the ɻaʞa^{n}-mandĕ, so called because it has deer sinew glued on its back.[3] Bows were made of hickory, ash, ironwood, or za^{n}zi, the last being greatly preferred. It is a wood resembling that of the Osage orange, with which some persons

FIG. 324.—Omaha bow (ɻaʞa^{n}-mandĕ).

confound it; but it is black and much harder than the former, the Osage orange wood being yellow, soft, and easily cut. The za^{n}zi is probably that which Dougherty[4] called "bow-wood (*Maclura aurantiaca* of Nuttall)."

[1] See First Annual Report of Bureau of Ethnology, 1879-'80; 1881, Pl. x, "Tolkotin cremation."

[2] This may be the "self-bow" mentioned in the American Naturalist for July, 1886, p. 675.

[3] This is the sinew-backed bow above mentioned.

[4] Long's Expedition, op. cit., vol. I, p. 290.

Bowstrings were made of the twisted sinew of the elk and buffalo, as among other tribes.

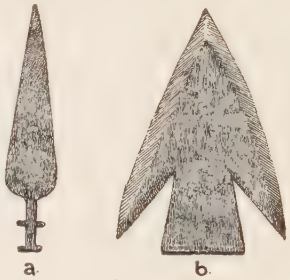
ARROWS.

The arrows (ma^{n}) used in former days were of several kinds. The hunting arrow, used for killing the buffalo, was generally about 2 feet long, of the usual cylindric form, and armed with an elongate triangular point, made at first of flint, afterward of sheet iron. The shoulders of the arrow were rounded instead of angular, as in the ordinary barbed form. The point, or head, was firmly secured to the shaft by deer sinew wrapped around the neck of the point, and over that was spread some cement, made in a manner to be afterward explained. The flight of the arrow was equalized by three half-webs of feathers, neatly fastened near its base in the usual manner.

FIG. 325.—Omaha hunting arrow.

Another kind of hunting arrow was the hidé nazíɸĕ, which was altogether of wood. About 6 inches from the point the shaft was triangular or quadrangular; and the point was made by holding the shaft close to a fire and turning it round and round till the heat had reduced it to the proper shape and had hardened it. This was used for killing fish, deer, and small game.

The war arrow (*b*) differed from that used in hunting in having a barbed point, which was very slightly attached to the shaft, so that if it penetrated the body of an enemy it could not be withdrawn without leaving the point in the wound.



a b

FIG. 326.—Omaha war arrow.

Children used the hidé-ɻáce, or target arrow, when they began to learn the use of the bow. With this a boy could kill small birds and animals.

FIG. 327.—Omaha style of hidé-ɻáce.

The Ponka used to make arrowshafts (ma^{n}sa) of ja^{n}-'qude-hí, "gray wood," juneberry wood, which grew in their country, but is not found among the Omaha. Most of the Omaha made their shafts of the ma^{n}'saqtihí, or "real arrow-wood," (*Viburnum*) as that was the wood best suited for the purpose. Sometimes they were made of chokecherry wood; and Joseph La Flèche informs me that he has made them of ash and hickory.

Arrowshafts were held lengthwise directly in a line with the eyes of the workman, who sighted along them to see if they were straight. If one was bent, he held one end of it between his teeth, while he pressed against the rest of it with his hands. They were polished by means of the polishers, or ma^{n}'-ɸiqɸáde, two pieces of sandstone, each of which had

a groove in the middle of one side. These grooves were brought together, and the arrow was drawn between them.

War arrows had crooked lines drawn along the shafts from the points to the other ends, down which, so I was informed by the Indians, it was intended that the blood of a wounded foe should trickle.

Arrowheads (máhi^{n}-sí), when made of flint, as at the first, were called "i^{n}'ĕ mahi^{n}sí," stone arrowheads. In more recent times, they were manufactured of pieces of sheet iron; as, for example, hoops of pails and barrels.

Arrow cement (hi^{n}'pa), for attaching the heads to the shafts, was usually made from the skin taken off a buffalo or elk head. This was boiled a long time, till ready to fall to pieces. When the gelatinous matter forming the cement rose to the top of the water, a stick (called hi^{n}pá-ja^{n}jiñ'ga) was thrust in and turned round and round, causing the material to be wrapped around it. When cooled it was smoothed with the hand. Then the act was repeated till a large quantity was collected on the stick. When needed for use, it was warmed by placing either in the mouth or in hot water. The skin of the big turtle was also used for making cement.

A set of arrows were called, collectively, "ma^{n}wi^{n}'da^{n}." A set generally consisted of ten arrows, but the number varied; sometimes there were two, four, or even twenty. When a man had arrows left in his quiver, he compared them with that which was in the slain animal. When he had none left, he appealed to some one who knew his style of arrow.

There were no clan or gentile marks on arrows. One set was distinguished from another by the order of the paint stripes on them, by the kind of feathers used, by the mode in which the arrowheads were made, etc. The Oto made bad arrows; those of the Pawnee were better, but they were inferior to those made by the Dakota, Ponka, and Omaha.

The feathers, half-webs generally, put on arrows were those of the eagle, buzzard, wild turkey, great owl, and goose. Sometimes hawk or crow feathers were employed.

Quivers.

Quivers (ma^{n}'jiha) for men were made of buffalo hide; but boys' quivers were made either of otter skins or of the skins of cougars, with the tail of the animal hanging down from the upper extremity. A skin case was attached to the quiver for carrying the bow when not in use. The wrist was defended from the percussion of the bowstring by the leather wristguard or áqande-**d**a.

Shields and Armor.

Shields (ɥaháwag¢e) were made of the hides of buffalo bulls. They were round and very thick, reaching to the waist of the bearer. Arrows did not penetrate them. Joseph La Flèche never heard of the use of defensive armor, such as helmet and mail, among the Omaha and Ponka.

He had heard of a Pawnee who made a coat from four elk skins, two forming the front and two the back. Between each pair of skins was placed sand. A helmet was made in like manner. It covered the back of the head and extended over the forehead, coming down as far as the eyes. When the Pawnee noticed an arrow coming toward him, he bowed his head forward.

Firearms.

Firearms were introduced among the Omaha prior to 1819, when Dougherty says that they preferred those called "Mackinaw guns."

CASA GRANDE RUIN

BY

COSMOS MINDELEFF

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CASA GRANDE RUIN

By Cosmos Mindeleff

INTRODUCTION.

LOCATION AND CHARACTER.

The Casa Grande ruin, situated near Gila river, in southern Arizona, is perhaps the best known specimen of aboriginal architecture in the United States, and no treatise on American antiquities is complete without a more or less extended description of it. Its literature, which extends over two centuries, is voluminous, but of little value to the practical scientific worker, since hardly two descriptions can be found which agree. The variations in size of the ruin given by various authors is astonishing, ranging from 1,500 square feet to nearly 5 acres or about 200,000 square feet in area. These extreme variations are doubtless due to difference of judgment as to what portion of the area covered by remains of walls should be assigned to the Casa Grande proper, for this structure is but a portion of a large group of ruins.

So far as known to the writer no accurate plan of the Casa Grande ruin proper has hitherto been made, although plans have been published; and very few data concerning the group of which it forms a part are available. It would seem, therefore, that a brief report presenting accurate plans and careful descriptions may be of value, even though no pretention to exhaustive treatment is made.

HISTORY AND LITERATURE.

The earlier writers on the Casa Grande generally state that it was in ruins at the time of the first Spanish invasion of the country, in 1540, and quote in support of this assertion Castañeda's description of a ruin encountered on the march.[1] Castañeda remarks that, "The structure was in ruins and without a roof." Elsewhere he says that the name "Chichilticale" was given to the place where they stopped because the monks found in the vicinity a house which had been inhabited by a people who came from Cibola. He surmises that the ruin was formerly

[1] Castañeda in Ternaux-Compans, Voyage de Cibola. French text, p. 1, pp. 41, 161-162. (The original text—Spanish—is in the Lenox Library; no English translation has yet been published.

a fortress, destroyed long before by the barbarous tribes which they found in the country. His description of these tribes seems to apply to the Apache.

The geographic data furnished by Castañeda and the other chroniclers of Coronado's expedition is very scanty, and the exact route followed has not yet been determined and probably never will be. So far as these data go, however, they are against the assumption that the Chichilticale of Castañeda is the Casa Grande of today. Mr. A. F. Bandelier, whose studies of the documentary history of the southwest are well known, inclines to the opinion that the vicinity of Old Camp Grant, on the Rio San Pedro, Arizona, more nearly fill the descriptions. Be this as it may, however, the work of Castañeda was lost to sight, and it is not until more than a century later that the authentic history of the ruin commences.

In 1694 the Jesuit Father Kino heard of the ruin, and later in the same year visited it and said mass within its walls. His secretary and usual companion on his missionary journeys, Mange by name, was not with him on this occasion, but in 1697 another visit was paid to the ruin and the description recorded by Mange[1] in his diary heads the long list of accounts extending down to the present time.[2] Mange describes the ruin as consisting of—

> A large edifice, the principal room in the center being four stories high, and those adjoining it on its four sides three stories, with walls 2 varas thick, of strong argamaso y baro (adobe) so smooth on the inside that they resemble planed boards, and so polished that they shine like Puebla pottery.

Mange also gives some details of construction, and states that in the immediate vicinity there were remains of twelve other buildings, the walls half fallen and the roofs burned out.

Following Mange's account there were a number of descriptions of no special value, and a more useful one written by Padre Font, who in 1775 and 1776 made a journey to Gila and Colorado rivers and beyond. This description[3] is quite circumstantial and is of especial interest because it formed the basis of nearly all the accounts written up to the time when that country came into our possession. According to this authority—

> The house forms an oblong square, facing exactly the four cardinal points, and round about it there are ruins indicating a fence or wall which surrounded the house and other buildings. The exterior or plaza extends north and south 420 feet and east and west 260 feet.

Font measured the five rooms of the main building, and recorded many interesting details. It will be noticed that he described a sur-

[1] An English translation is given by H. H. Bancroft, Works, iv, p. 622, note. Also by Bartlett, Personal Narrative, 1854, vol. ii, pp. 281-282; another was published by Schoolcraft, Hist. Cond. and Pros. of Am. Ind., vol. iii, 1853, p. 301.

[2] Quite an extensive list is given by Bancroft (op. cit., pp. 622-625, notes), and by Bandelier in Papers Arch. Inst. of Amer., American series, i, p. 11, note.

[3] A number of copies of Font's Journal are known. Bancroft gives a partial translation in op. cit., p. 623, note), as does also Bartlett (op. cit., pp. 278–280); and a French translation is given by Ternaux Compans, ix, Voyages de Cibola, appendix.

rounding wall inclosing a comparatively large area; and nearly all the writers who published accounts prior to our conquest of the country in 1846 based their descriptions on Font's journal and erroneously applied his measurement of the supposed circumscribing wall to the Casa Grande proper.

The conquest of the country by the "Army of the West" attracted attention anew to the ruin, through the descriptions of Colonel Emory and Captain Johnston. The expedition passed up the Gila valley, and Colonel Emory, in his journal, gives a fanciful illustration and a slight description. The journal of Captain Johnston contained a somewhat better description and a rough but fairly good sketch. The best description of that period, however, was that given by John Russell Bartlett, in his "Personal Narrative," published in 1854.

Bartlett observed that the ruin consists of three buildings, "all included within an area of 150 yards." He described these buildings and gave ground plans of two of them and elevations of the principal structure. He also gave a translation of a portion of Font's journal, as well as the previous description of Mange. He surmised that the central room of the main building, and perhaps the whole structure, was used for the storage of corn.

Bartlett's account held place for nearly thirty years as the main reliance of compilers, and it forms today one of the most circumstantial and comprehensive descriptions extant. Other descriptions appeared at intervals of a few years, some compiled from Bartlett and Font, others based on personal observation, but none of them containing anything new, until the account of Mr. A. F. Bandelier, published some ten years ago,[1] is reached.

Mr. Bandelier described the large group, of which the Casa Grande forms a part, and gave its dimensions as 400 meters (1,300 feet) north and south by 200 meters (650 feet) east and west. He also described and gave measurements of the Casa Grande proper and discusses its place in the field of aboriginal architecture. In a later publication[2] he discussed the ruin at somewhat greater length, and presented also a rough sketch plan of the group and ground plans of the Casa Grande and of the mound north of it. He gave a short history of the ruin and quite an extended account of the Pima traditions concerning it. He considered the Casa Grande a stronghold or fortress, a place of last resort, the counterpart, functionally, of the blockhouse of the early settlers of eastern United States.

In 1888 Mr. F. H. Cushing presented to the Congrès International des Américanistes[3] some "Preliminary notes" on his work as director of the Hemenway southwestern archeological expedition. Mr. Cushing did not describe the Casa Grande, but merely alluded to it as a sur-

[1] Archæological Inst. of Amer., 5th Ann. Rep., 1884.
[2] Papers Archæol. Inst. of Amer., Amer. ser., iv, Cambridge, 1892, p. 453 et seq.
[3] Berlin meeting, 1888; Compte-Rendu, Berlin, 1890, p. 150 et seq.

viving example of the temple, or principal structure, which occurred in conjunction with nearly all the settlements studied. As Mr. Cushing's work was devoted, however, to the investigation of remains analogous to, if not identical with, the Casa Grande, his report forms a valuable contribution to the literature of this subject, and although not everyone can accept the broad inferences and generalizations drawn by Mr. Cushing—of which he was able, unfortunately, to present only a mere statement—the report should be consulted by every student of southwestern archeology.

The latest contribution to the literature of the Casa Grande is a report by Dr. J. Walter Fewkes,[1] also of the Hemenway expedition, under the title "On the present condition of a ruin in Arizona called Casa Grande." Two magnificent illustrations are presented, engravings from photographs, showing general views of the ruin, as well as a number of views depicting details, and the ground plan presented at the end of the report is the best so far published. It is unfortunate that this author was not able to give more time to the study of the ruin; yet his report is a valuable contribution to our knowledge concerning the Casa Grande.

DESCRIPTION.

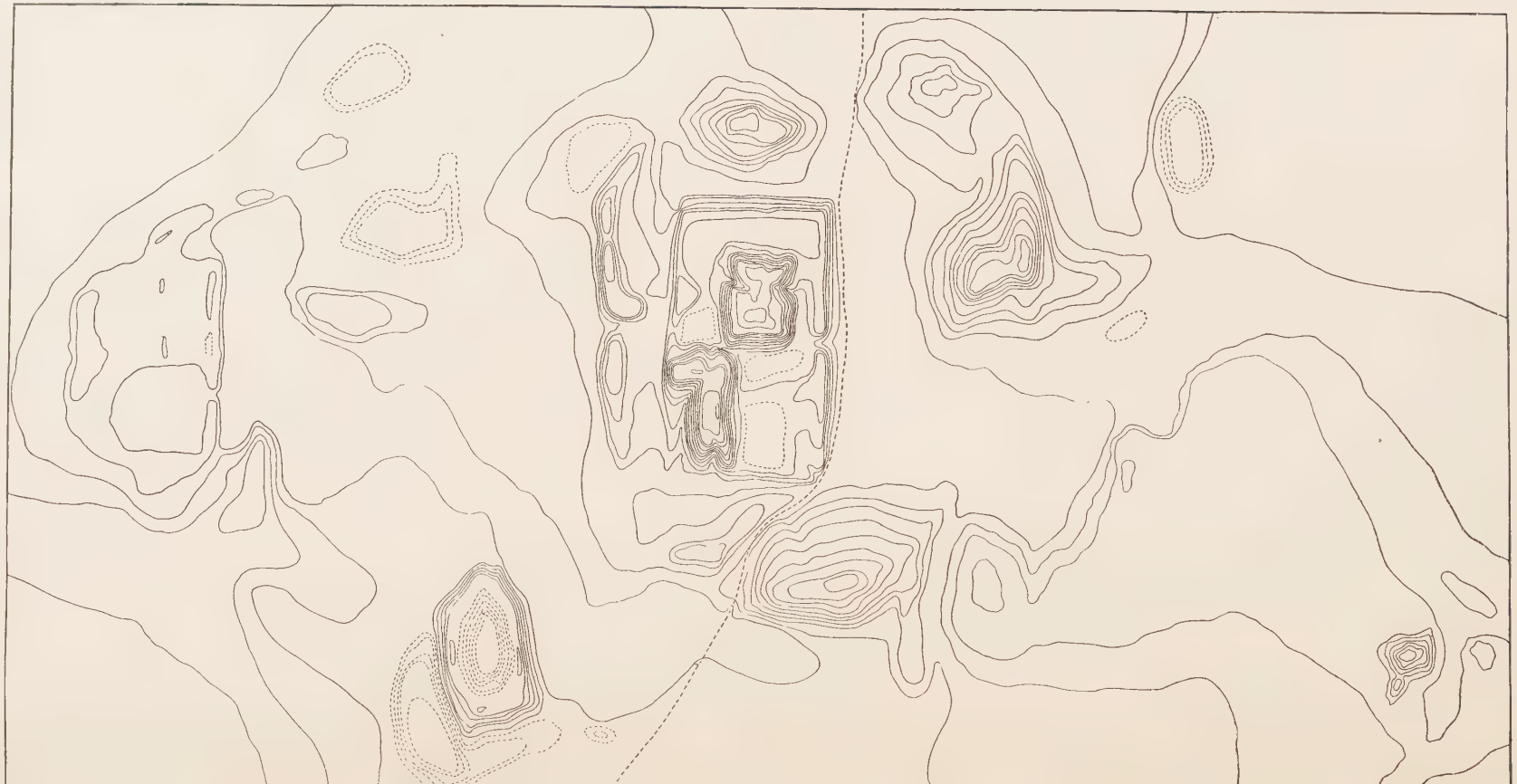
THE CASA GRANDE GROUP.

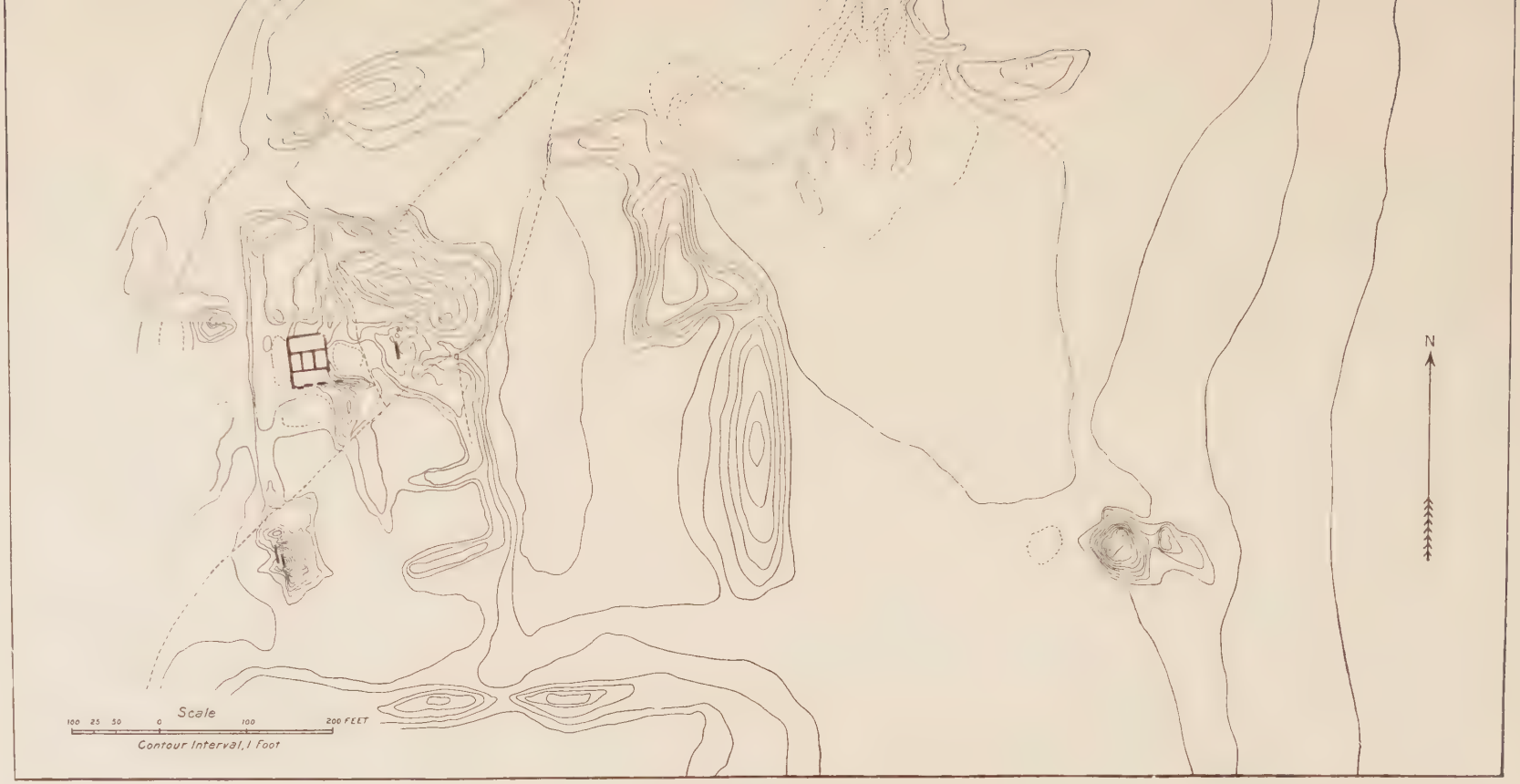
The Casa Grande has been variously placed at from 2 leagues to 2 miles south of Gila river. The writer has never traversed the distance from the ruin to the river, but the ruin is about a mile from Walker ranch, which is well known in that neighborhood, and about half a mile from the river. This question, however, is not of much importance, as the ruin is easily found by anyone looking for it, being located directly on one of the stage routes from Casa Grande station, on the Southern Pacific railroad, to Florence, Arizona, and about 9 miles below, or west of, the latter place.

The name Casa Grande has been usually applied to a single structure standing near the southwestern corner of a large area covered by mounds and other débris, but some writers have applied it to the southwestern portion of the area and even to the whole area. The latter seems the proper application of the term, but to avoid confusion, where both the settlement as a whole and that portion which has formed the theme of so many writers are referred to, the settlement will be designated as the Casa Grande group, and the single structure with standing walls as the Casa Grande ruin.

Probably no two investigators would assign the same limits to the area covered by the group, as the margins of this area merge imperceptibly into the surrounding country. The accompanying map (plate LI) shows this area as interpreted by the writer. The surface covered

[1] Jour. of Amer. Ethn. and Arch., Cambridge, 1892, vol. ii, page 179 et seq.





MAP OF CASA GRANDE GROUP.

by well defined remains, as there shown, extends about 1,800 feet north and south and 1,500 feet east and west, or a total area of about 65 acres.

The Casa Grande ruin, as the term is here used, occupies a position near the southwestern corner of the group, and it will be noticed that its size is insignificant as compared with that of the entire group, or even with the large structure in the north-central part of it. The division of the group into northern and southern portions, which has been made by some writers, is clearly shown on the map; but this division is more apparent than real. The contour interval on the map is one foot—a sufficiently small interval to show the surface configuration closely and to bring out some of its peculiarities. Depressions are shown by dotted contours. It will be noticed that while most of the mounds which mark the sites of former structures rise but 10 feet or less above the surrounding level, the profiles vary considerably, some being much more smoothed off and rounded than others, the former being shown on the map by even, "flowing" contours, while the latter are more irregular; and it will be further noticed that the irregularity reaches its maximum in the vicinity of the Casa Grande ruin proper, where the ground surface was more recently formed, from the fall of walls that were standing within the historical period.

External appearance is a very unsafe criterion of age, although in some cases, like the present, it affords a fair basis for hypothesis as to comparative age; but even in this case, where the various portions of the group have presumably been affected alike by climatic and other influences, such hypothesis, while perhaps interesting, must be used with the greatest caution. Within a few miles of this place the writer has seen the remains of a modern adobe house whose maximum age could not exceed a decade or two, yet which presented an appearance of antiquity quite as great as that of the wall remains east and southeast of the Casa Grande ruin.

The application of the hypothesis to the map brings out some interesting results. In the first place, it may be seen that in the lowest mounds, such as those in the northwestern corner of the sheet, on the southern margin, and southwest of the well-marked mound on the eastern margin, the contours are more flowing and the slopes more gentle than in others. This suggests that these smoothed mounds are older than the others, and, further, that their present height is not so great as their former height; and again, under this hypothesis, it suggests that the remains do not belong to one period, but that the interval which elapsed between the abandonment of the structures whose sites are marked by the low mounds and the most recent abandonment was long. In other words, this group, under the hypothesis, affords another illustration of a fact constantly impressed on the student of southwestern village remains, that each village site marks but an epoch in the history of the tribe occupying it—a period during which there was constant,

incessant change, new bands or minor divisions of the tribe appearing on the scene, other divisions leaving the parent village for other sites, and the ebb and flow continuing until at some period in its history the population of a village sometimes became so reduced that the remainder, as a matter of precaution, or for some trifling reason, abandoned it en masse. This phase of pueblo life, more prominent in the olden days than at present, but still extant, has not received the prominence it deserves in the study of southwestern remains. Its effects can be seen in almost every ruin; not all the villages of a group, nor even all the parts of a village, were inhabited at the same time, and estimates of population based on the number of ruins within a given region, and even those based on the size of a given ruin, must be materially revised. As this subject has been elsewhere[1] discussed, it can be dismissed here with the statement that the Casa Grande group seems to have formed no exception to the general rule, but that its population changed from time to time, and that the extent of the remains is no criterion of the former population.

It will be noticed that in some of the mounds, noticeably those in the immediate vicinity of the Casa Grande ruin, the surface is very irregular. In this instance the irregularity indicates a recent formation of surface; for at this point many walls now marked only by mounds were standing within the historical period. External contour is of course a product of erosion, yet similarity of contour does not necessarily indicate either equal erosion or equal antiquity. Surface erosion does not become a prominent factor until after the walls have fallen, and one wall may easily last for a century or two centuries longer than another similarly situated. The surface erosion of a standing wall of grout, such as these under discussion, is very slight; photographs of the Casa Grande ruin, extending over a period of sixteen years, and made from practically the same point of view, show that the skyline or silhouette remained essentially unchanged during that period, every little knob and projection remaining the same. It is through sapping or undermining at the ground surface that walls are destroyed. An inspection of the illustrations accompanying this paper will show what is meant by sapping: the external walls are cut away at the ground surface to a depth varying from a few inches to nearly 2 feet. After a rain the ground, and that portion of the walls at present below its surface, retains moisture much longer than the part of the walls which stands clear; the moisture rises by capillary attraction a foot or two above the ground surface, rendering the walls at this level softer than elsewhere, and as this portion is more exposed to the flying sand which the wind sweeps over the ground it is here that erosion attains its maximum. The wall is gradually cut away at and just above the ground surface until finally the base becomes too small to support it and it falls en masse. Then and not till then surface erosion becomes an important factor and the profile of

[1] See pp. 179–261 of this Report, "Aboriginal Remains in Verde Valley."

the mass becomes finally rounded. But it will be readily seen that a slight difference of texture, or thickness, or exposure, or some trifling difference too minute for observation, might easily add many decades to the apparent age of a mound. The walls once fallen, however, the rounding or smoothing of the mounds would probably proceed at an equal rate throughout the group, and study of the profile gives a fairly good estimate as to the comparative age of the mounds. On this basis the most ancient mounds are those specified above, while the most recent are those in the immediate vicinity of the Casa Grande ruin. This esti-

FIG. 328.—Map of large mound.

mate accords well with the limited historical data and with the Pima traditions, which recount that the Casa Grande ruin was the last inhabited village in this vicinity.

Probably intermediate in time between the Casa Grande ruin and the rounded mounds described above should be placed the large structure occupying the northern-central part of the map. This mound is deserving of more than a passing notice. It consists of two mounds,

each four or five times the size of the Casa Grande ruin, resting on a flat-topped pedestal or terrace about 5 feet above the general level. The summits of these mounds, which are nearly flat, are some 13 feet above this level. The sides of the mounds slope very sharply, and have suffered somewhat from erosion, being cut by deep gullies, as shown in figure 328, which is an enlargement from the map. It has been stated that these structures were mounds, pure and simple, used for sacrifice or worship, resembling somewhat the well-known pyramid of Cholula; but there is no doubt that they are the remains of house-structures, for a careful examination of the surface on the slopes, reveals the ends of regular walls. The height is not exceptional, the mound on the east being less than 3 feet lower, while the one on the southeast lacks less than 4 feet of its height. The characteristic feature, however, and one difficult to explain, except on the hypothesis stated, is the sharp slope of the sides. It will be noticed that the raised base or ter race on which the mounds are located is not perfectly flat, but on the contrary has a raised rim. This rim seems quite inconsistent with the theory which has been advanced that the terrace was built up solidly as a terrace or base, as in that case it would seem natural that the slope from the base of the mounds to the edge of the terrace would be continuous.

There is an abundance of room between the crest of the rim and the base of the terrace for a row of single rooms, inclosing a court within which the main structures stood, or such a court may have been covered, wholly or partly with clusters of rooms, single storied outside, but rising in the center, in two main clusters, three or more stories high. Such an agglomeration of rooms might under certain conditions produce the result seen here, although a circumscribing heavy wall, occupying the position of the crest of the rim and inclosing two main clusters each rising three or more stories, might also produce this result. The difficulty with the latter hypothesis is, however, that under it we should expect to find a greater depression between the base of the mounds and the edge of the terrace. The most reasonable hypothesis, therefore, is that the space between the base of the mounds and the edge of the terrace was occupied by rooms of one story. This would also help to explain the steepness of the slopes of the mounds themselves. The walls of the structures they represent, being protected by the adjacent low walls of the one-story rooms, would not suffer appreciably by undermining at the ground level, and if the central room or rooms of each cluster were higher than the surrounding rooms, as is the case in the Casa Grande ruin, the exterior walls, being usually heavier than the inner walls, would be the last to succumb, the clusters would be filled up by the disintegration of the inner walls, and not until the spaces between the low one-story walls surrounding the central cluster were nearly filled up would the pronounced disintegration of the outer walls of the structures commence. At that period the walls were prob-

GROUND PLAN OF CASA GRANDE RUIN.

ably covered and protected by débris dropping from above, and possibly the profile of the mounds was already established, being only slightly modified by surface erosion since.

About the center of the eastern side of the terrace, and also on the western side, the water which falls on the surface of the structure is discharged through rather pronounced depressions at these points. These depressions are not the work of running water, though doubtless emphasized by that agency, but represent low or open spaces in the original structure, probably passageways or gateways. Furthermore, before or inside each gateway there is a slightly depressed area, just where we would expect to find it under our hypothesis, and showing that the process of filling in is not yet completed. If the structure were to remain undisturbed for some decades longer these spaces would doubtless be filled up from material washed from the mounds, giving eventually a continuous slope from the base of the mounds to the edge of the terrace.

On the eastern margin of the map and in the southeastern corner two small and sharply defined mounds, differing in character from any others of the group, are represented. That shown on the eastern margin rises about 6 feet and the other about 10 feet above the surrounding level, and both stand out alone, no other remains occurring within a hundred yards in any direction. These mounds seem a thing apart from the other remains in the group; and it is probable that they represent the latest period in the occupancy of this site, or possibly a period subsequent to its final abandonment as a place of residence. Analogous remains occur in conjunction with some large ruins in the north, and there they represent single rooms, parts of the original structure kept in a fair state of preservation by occasional repairs while the remainder of the village was going to ruin, and used as farming outlooks long after the site was abandoned as a place of residence. As these farming outlooks have been discussed at some length in another paper[1] it is not necessary here to enlarge upon their function and the important part they play in Pueblo architecture. If the high mounds in question mark, as supposed, the sites of farming outlooks such as those which are found in the north, they indicate that the occupancy of the region in which they occur was continued after the abandonment of the Casa Grande structure by the people who built it or by people of similar habits and customs.

An inspection of the map will show a number of depressions, some of quite large area, indicated by dotted contour lines. The principal one occurs a little west of the center of the area, and is worth more than a passing notice since similar structures are widely distributed throughout this region. It may be roughly characterized as a mound with excavated center. The ground for some distance about the structure (except for two depressions discussed later) is quite flat. From this

[1] A Study of Pueblo Architecture; 8th Ann. Rep. Bur. Eth., 1891, pp. 86, 227, and elsewhere.

flat surface as a base the structure rises to a height of 5 feet. From the exterior it has the appearance of an ordinary mound, but on reaching the top the interior is found to be hollowed out to a depth which even at the present day is below the surrounding surface, although not below the depressions adjoining. The main structure or mound is shown in figure 329 (an enlargement from the map). It measures on top of the crest 150 feet from north to south and about 80 feet from east to west, but covers a ground area of 200 feet by 120 feet or over half an acre. The crest is of the same height throughout, except for slight elevations on the eastern and western sides and a little knoll or

FIG. 329.—Map of hollow mound.

swell in the southwestern corner. There is no indication of any break in the continuity of the crest such as would be found were there openings or gateways to the interior. The bottom of the depression in the main structure is at present about a foot below the surrounding ground surface, but it must have been originally considerably more than this, as the profile indicates long exposure to atmospheric erosion and consequent filling of the interior. No excavation was made and the character of the construction can not be determined, but the mound is apparently a simple earth structure—not laid up in blocks, like the Casa Grande ruin.

GENERAL VIEW OF CASA GRANDE RUIN.

To the east and to the west are two large depressions, each about 5 feet below the surrounding ground surface, evidently the places whence the material for the construction of the mound was obtained. Yet the amount of material removed from these excavations must have been considerably in excess of that used in the construction of the mound, and this excess was doubtless utilized in neighboring constructions, since it is hardly to be supposed that it was carried away to any considerable distance.

The purpose of this hollow mound, which is a fair type of many similar structures found in this region, is not clear. Mr. Frank Hamilton Cushing, while director of the Hemenway southwestern archeological expedition, found a number of these structures and excavated some of them. From remains thus found he concluded that they were sun-temples, as he termed them, and that they were covered with a roof made of coiled strands of grass, after a manner analogous to that in which pueblo baskets are made. A somewhat similar class of structures was found by the writer on the upper Rio Verde, but these were probably thrashing floors. Possibly the structure under discussion was for a similar purpose, yet its depth in proportion to its size was almost too great for such use. The question must be left for determination if possible by excavation.

In the southern central part of the map is shown another excavation, covering a larger area than any of the others, of very irregular outline and from 3 to 4 feet deep. It is apparently older than the others and probably furnished the material for the house structures northeast and southwest of it. Bordering the depression on the south there are some low mounds, almost obliterated, which probably were the sites of other house structures.

Scattered about the area shown on the map there are several small depressions, usually more regular in outline than those described. The best example is situated near the northeastern corner of the area. It is situated in the point of a low promontory, is about 3 feet deep, almost regularly oval in outline, and measures about 50 by 100 feet. A similar depression less than 2 feet deep occurs near the northwest corner of the area, and immediately south of the last there is another, more irregular in outline, and nearly 3 feet deep. There are also some small depressions in the immediate vicinity of the Casa Grande ruin and of the mounds north of it.

With a single exception none of these depressions are so situated that they could be used as reservoirs for the storage of water collected from the surface, and the catchment area of the depressions is so small and the rate of evaporation in this area so great that their use as reservoirs is out of the question. It is probable that all of the smaller depressions represent simply sites where building material was obtained. Possibly the ground at these points furnished more suitable material than elsewhere, and, if so, the builders may have taken the trouble to transport

it several hundred yards rather than follow the usual practice of using material within a few feet of the site. This hypothesis would explain the large size of the depressions, otherwise an anomalous feature.

CASA GRANDE RUIN.

STATE OF PRESERVATION.

The area occupied by the Casa Grande ruin is insignificant as compared with that of the entire group, yet it has attracted the greater attention because it comprises practically all the walls still standing. There is only one small fragment of wall east of the main structure and another south of it.

The ruin is especially interesting because it is the best preserved example now remaining of a type of structure which, there is reason to believe, was widely distributed throughout the Gila valley, and which, so far as now known, is not found elsewhere. The conditions under which pueblo architecture developed in the north were peculiar, and stamped themselves indelibly on the house structures there found. Here in the south there is a radical change in physical environment: even the available building material was different, and while it is probable that a systematic investigation of this field will show essentially the same ideas that in the north are worked out in stone, here embodied in a different material and doubtless somewhat modified to suit the changed environment, yet any general conclusion based on the study of a single ruin would be unsafe. In the present state of knowledge of this field it is not advisable to attempt more than a detailed description, embodying, however, a few inferences, applicable to this ruin only, which seem well supported by the evidence obtained.

The Casa Grande ruin is located near the southwestern corner of the group, and the ground surface for miles about it in every direction is so flat that from the summit of the walls an immense stretch of country is brought under view. On the east is the broad valley of Gila river, rising in a great plain to a distant range of mountains. About a mile and a half toward the north a fringe of cottonwood trees marks the course of the river, beyond which the plain continues, broken somewhat by hills and buttes, until the view is closed by the Superstition mountains. On the northwest the valley of Gila river runs into the horizon, with a few buttes here and there. On the west lies a range of mountains closing the valley in that direction, while toward the southwest and south it extends until in places it meets the horizon, while in other places it is closed by ranges of mountain blue and misty in the distance. In an experience of some years among northern ruins, many of them located with special reference to outlook over tillable lands, the writer has found no other ruin so well situated as this.

The character of the site occupied by the ruin indicates that it belongs to a late date if not to the final period in the occupancy of this

STANDING WALL NEAR CASA GRANDE.

region, a period when by reason of natural increase of numbers, or perhaps aggregation of related gentes, the defense motive no longer dominated the selection of a village site, but reliance was placed on numbers and character of structures, and the builders felt free to select a site with reference only to their wants as a horticultural people. This period or stage has been reached by many of the Pueblo tribes, although mostly within the historical period; but some of them, the Tusayan for example, are still in a prior stage.

A ground plan of the ruin is shown in plate LII, and a general view in plate LIII. The area covered and inclosed by standing walls is about 43 feet by 59 feet, but the building is not exactly rectangular, and the common statement that it faces the cardinal points is erroneous. The variation from the magnetic north is shown on the ground plan, which was made in December, 1890. The building comprised three central rooms, each approximately 10 by 24 feet, arranged side by side with the longer axes north and south, and two other rooms, each about 9 by 35 feet, occupying respectively the northern and southern ends of the building, and arranged transversely across the ends of the central rooms, with the longer axes running east and west. Except the central room, which was three stories in height, all the rooms were two stories above the ground. The northeastern and southeastern corners of the structure have fallen, and large blocks of the material of which they were composed are strewn upon the ground in the vicinity. It is probable that the destruction of these corners prior to that of the rest of the building was due to the disintegration of minor walls connected with them and extending, as shown by the ridges on the ground plan, northward from the northeastern corner and eastward from the southeastern corner. These walls doubtless formed part of the original structure and were probably erected with it; otherwise the corners of the main structure would not have been torn out or strained enough to fall before the rest of the building was affected.

It is not likely that the main building originally stood alone as at present. On the contrary there is every reason to suppose that it was connected with other buildings about 75 feet east of it, now marked by a bit of standing wall shown on the map (plate LI), and probably also with a small structure about 170 feet south of it, shown in plate LIV. These connections seem to have been by open courts inclosed by walls and not by continuous buildings. The court east of the ruin is well marked by the contours and seems to have been entered by a gateway or opening at its southeastern corner.

DIMENSIONS.

It is probable that the area immediately adjacent to the ruin, and now covered by mounds, carried buildings of the same time with the main structure and was occupied contemporaneously with it or nearly so. This area, well marked on the map, measures about 400 feet

north and south, and 240 feet east and west. It is not rectangular, although the eastern and western sides, now marked by long ridges, are roughly parallel. The northeastern corner does not conform to a rectangular plan, and the southern side is not more than half closed by the low ridge which extends partly across it. This area is doubtless the one measured in 1776, by Padre Font, whose description was copied by later writers, and whose measurements were applied by Humboldt and others to the ruin itself. Font gave his measurements as those of a circumscribing wall, and his inference has been adopted by many, in fact most, later writers. A circumscribing wall is an anomalous feature, in the experience of the writer, and a close inspection of the general map will show that Font's inference is hardly justified by the condition of the remains today. It seems more likely that the area in question was covered by groups of buildings and rows of rooms, connected by open courts, and forming an outline sometimes regular for a considerable distance, but more often irregular, after the manner of pueblo structures today. The long north and south ridge which forms the southeastern corner of the area, with other ridges extending westward, is quite wide on top, wide enough to accommodate a single row of rooms of the same width as those of the ruin, and it is hardly reasonable to suppose that a wall would be built 10 or 12 feet wide when one of 4 feet would serve every purpose to which it could possibly be put. Furthermore, the supposition of an inclosing wall does not leave any reasonable explanation of the transverse ridges above mentioned, nor of the long ridge which runs southward from the southeastern corner of the ruin.

The exterior walls rise to a height of from 20 to 25 feet above the ground. This height accommodated two stories, but the top of the wall is now 1 to 2 feet higher than the roof level of the second story. The middle room or space was built up three stories high and the walls are now 28 to 30 feet above the ground level. The tops of the walls, while rough and much eroded, are approximately level. The exterior surface of the walls is rough, as shown in the illustrations, but the interior walls of the rooms are finished with a remarkable degree of smoothness, so much so as to attract the attention of everyone who has visited the ruin. Mange, who saw the ruin with Padre Font in 1697, says the walls shine like Puebla pottery, and they still retain this finish wherever the surface has not cracked off. This fine finish is shown in a number of illustrations herewith. The walls are not of even thickness. At the ground level the exterior wall is from $3\frac{1}{2}$ to $4\frac{1}{2}$ feet thick, and in one place at the southern end of the eastern wall, is a trifle over 5 feet thick. The interior walls are from 3 to 4 feet thick at base. At the top the walls are reduced to about 2 feet thick, partly by setbacks or steps at the floor levels, partly by exterior batter, the interior wall surface being approximately vertical. Some writers, noting the inclination of the outer wall surface, and not seeing the interior,

WEST FRONT OF CASA GRANDE RUIN.

have inferred that the walls leaned considerably away from the perpendicular. This inference has been strengthened, in some cases, by an examination of the interior, for the inner wall surface, while finely finished, is not by any means a plane surface, being generally concave in each room; yet a line drawn from floor level to floor level would be very nearly vertical. The building was constructed by crude methods, thoroughly aboriginal in character, and there is no uniformity in its measurements. The walls, even in the same room, are not of even thickness, the floor joists were seldom on a straight line, and measurements made at similar places, e. g., the two ends of a room, seldom agree.

A series of precise measurements gives the following results: Outside eastern wall, at level 3 feet above center of depressed area adjoining the ruin on the east, 59 feet; western wall at same level, 59 feet 1 inch; northern and southern walls, at same level, 42 and 43 feet respectively. These measurements are between points formed by the intersection of the wall lines; the northeastern and southeastern corners having fallen, the actual length of standing wall is less. At the level stated the northern wall measures but 34 feet 4 inches, and the southern wall 36 feet 10 inches. A similar irregularity is found in the interior measurements of rooms. The middle room is marked by an exceptional departure from regularity in shape and dimensions. Both the east and west walls are bowed eastward, making the western wall convex and the eastern wall concave in reference to the room.

Precise measurements of the middle room at the second floor level, 8 feet above the base previously stated, are as follows: Eastern side, 24 feet 8½ inches; western side, 24 feet 2 inches; northern side, 9 feet 3½ inches; southern side, 9 feet 1 inch. The eastern room is a little more regular, but there is a difference of 11 inches between the measurements of the northern and southern ends. A similar difference is found in the western room, amounting there to 6 inches. The northern and southern rooms do not afford as good bases for comparison, as a corner is missing in each; but measurements to a point where the interior wall surfaces would intersect if prolonged, show variations of from 6 inches to a foot. The statement that the ruin exhibits exceptional skill in construction on the part of the builders, is not, therefore, supported by facts.

DETAILED DESCRIPTION.

The Casa Grande ruin is often referred to as an adobe structure. Adobe construction, if we limit the word to its proper meaning, consists of the use of molded brick, dried in the sun but not baked. Adobe, as thus defined, is very largely used throughout the southwest, more than nine out of ten houses erected by the Mexican population and many of those erected by the Pueblo Indians being so constructed; but, in the experience of the writer, it is never found in the older ruins, although seen to a limited extent in ruins known to belong to a period

subsequent to the Spanish conquest. Its discovery, therefore, in the Casa Grande would be important; but no trace of it can be found. The walls are composed of huge blocks of earth, 3 to 5 feet long, 2 feet high, and 3 to 4 feet thick. These blocks were not molded and placed in situ, but were manufactured in place. The method adopted was probably the erection of a framework of canes or light poles, woven with reeds or grass, forming two parallel surfaces or planes, some 3 or 4 feet apart and about 5 feet long. Into this open box or trough was rammed clayey earth obtained from the immediate vicinity and mixed with water to a heavy paste. When the mass was sufficiently dry, the framework was moved along the wall and the operation repeated. This is the typical pisé or rammed-earth construction, and in the hands of skilled workmen it suffices for the construction of quite elaborate buildings. As here used, however, the appliances were rude and the workmen unskilled. An inspection of the illustrations herewith, especially of plate LV, showing the western wall of the ruin, will indicate clearly how this work was done. The horizontal lines, marking what may be called courses, are very well defined, and, while the vertical joints are not apparent in the illustration, a close inspection of the wall itself shows them. It will be noticed that the builders were unable to keep straight courses, and that occasional thin courses were put in to bring the wall up to a general level. This is even more noticeable in other parts of the ruin. It is probable that as the walls rose the exterior surface was smoothed with the hand or with some suitable implement, but it was not carefully finished like the interior, nor was it treated like the latter with a specially prepared material. The material employed for the walls was admirably suited for the purpose, being when dry almost as hard as sandstone and practically indestructible. The manner in which such walls disintegrate under atmospheric influences has already been set forth in detail in this report. An inhabited structure with walls like these would last indefinitely, provided occupancy continued and a few slight repairs, which would accompany occupancy, were made at the conclusion of each rainy season. When abandoned, however, sapping at the ground level would commence, and would in time level all the walls; yet in the two centuries which have elapsed since Padre Kino's visit—and the Casa Grande was then a ruin—there has been but little destruction, the damage done by relic hunters in the last twenty years being in fact much greater than that wrought by the elements in the preceding two centuries. The relic hunters seem to have had a craze for wood, as the lintels of openings and even the stumps of floor joists have been torn out and carried away. The writer has been reliably informed that as late as twenty years ago a portion of the floor or roof in one of the rooms was still in place, but at the present day nothing is left of the floors except marks on the vertical walls, and a few stumps of floor joists, deeply imbedded in the walls, and so high that they can not be seen from the ground.

INTERIOR WALL OF CASA GRANDE RUIN.

The floors of the rooms, which were also the roofs of the rooms below, were of the ordinary pueblo type, employed also today by the American and Mexican population of this region. In the Casa Grande ruin a series of light joists or heavy poles was laid across the shorter axis of the room at the time the walls were erected; these poles were 3 to 6 inches in diameter, not selected or laid with unusual care, as the holes in the side walls which mark the places they occupied are seldom in a straight line, and their shape often indicates that the poles were quite crooked. Better executed examples of the same construction are often found in northern ruins. Over the primary series of joists was placed a layer of light poles, 1½ to 2 inches in diameter, and over these reeds and coarse grass were spread. The prints of the light poles can still be seen on the walls. The floor or roof was then finished with a heavy coating of clay, trodden down solid and smoothed to a level. A number of blocks of this final floor finish, bearing the impress of the grass and reeds, were found in the middle room. There is usually a setback in the wall at the floor level, but this practice was not followed in all the rooms.

The position of the floor is well marked in all cases by holes in the wall, into which beams projected sometimes to a depth of 3 feet, and by a peculiar roughness of the wall. Plate LVI shows two floor levels, both set back slightly and the upper one strongly marked by the roughness mentioned. This roughness apparently marks the thickness of the floor in some cases, yet in others it is much too thick for a floor and must have had some other purpose. The relation of these marks to the beam holes suggests that in some cases there was a low and probably narrow bench around two or more sides of the room; such benches are often found in the present Pueblo villages.

The walls of the northern room are fairly well preserved, except in the northeastern corner, which has fallen. The principal floor beams were of necessity laid north and south, across the shorter axis of the room, while the secondary series of poles, 1½ inches in diameter, have left their impression in the eastern and western walls. There is no setback in the northern wall at the first floor level, though there is a very slight one in the southern wall; none appears in the eastern and western walls. Yet in the second roof level there is a double setback of 9 and 5 inches in the western wall, and the northern wall has a setback of 9 inches, and the top of the wall still shows the position of nearly all the roof timbers. This suggests—and the suggestion is supported by other facts to be mentioned later—that the northern room was added after the completion of the rest of the edifice.

The second roof or third floor level, the present top of the wall, has a decided pitch outward, amounting to nearly 5 inches. Furthermore, the outside of the northern wall of the middle room, above the second roof level of the northern room, is very much eroded. This indicates that the northern room never had a greater height than two stories, but probably the walls were crowned with low parapets. In this connec-

tion it may be stated that a calculation of the amount of débris within the building and for a distance of 10 feet about it in every direction, the interior floor level being determined by excavation, showed an amount of material which, added to the walls, would raise them less than 3 feet; in other words, the present height of the walls is very nearly the maximum height.

Subsequent to this examination the ruin was cleared out by contractors for the Government in carrying out a plan for the repair and preservation of the ruin, and it was reported that in one of the rooms a floor level below that previously determined was found, making an underground story or cellar. This would but slightly modify the foregoing conclusion, as the additional débris would raise the walls less than a foot, and in the calculation no account was taken of material removed from the surface of the walls.

In support of the hypothesis that the second roof level of the northern room was the top roof, it may be stated that there is no trace of an opening in the walls above that level, except on the western side. There was a narrow opening in the western corner, but so well filled that it is hardly perceptible. Doubtless it formed a niche or opening in the parapet.

The southern wall on the first roof level still preserves very clear and distinct impressions of the rushes which were used in the construction of the roof. In some cases these impressions occur 3 inches above the top of the floor beams, in others directly above them, showing that the secondary series of poles was very irregularly placed. In the eastern and western walls the impressions of rushes are also clear, but there they are parallel with the wall surface. The rushes were about the thickness of a pencil.

The floor joists were 3 to 4 inches in diameter, and as a rule projected into the wall but 5 to 8 inches. In some places in the northern wall, however, they extended into the masonry as much as 3 feet 3 inches. The beams were doubtless cut by guess, at the place where trees of the requisite size were found, according to the method employed by the Pueblo Indians today, and if, as supposed, the northern room was built after the rest of the structure, the excess in length would necessarily be found in the northern wall.

In the roof construction previously described rushes or canes formed the third member, and in the northern room the wall is rough immediately above the impressions of rushes, and projects 8 to 12 inches. This feature is well marked; it may be a remnant of the clay covering of floor or roof, but it is almost too thick for that and possibly marks the position of a low bench, as previously suggested. The bottoms of the openings come just to or a trifle above the top of this marking.

The walls of the western room were smoothly finished and the finish is well preserved, but here, as in the northern room, the exterior wall of the middle room was not finished above the second roof level, and

BLOCKED OPENING IN WEST WALL.

there is no doubt that two stories above the ground were the maximum height of the western rooms, excluding the parapet. The eastern wall presents a marked double convexity while the western wall is comparatively straight in a horizontal line, but markedly concave vertically above the first roof level. Below this level it is straight. The floor beams were from 3 to 6 inches in diameter. The marks in the eastern wall show that the beams projected into it to a nearly uniform depth of 1 foot 4 inches. In the western wall, however, the depth varies from 1 to 3 feet. The beams which entered the eastern wall were very irregularly placed, the line rising in the center some 3 or 4 inches. The beams of the second roof level show the same irregularity and in the same place; possibly this was done to correct a level, for the same feature is repeated in the eastern room.

The walls of the southern room are perhaps better finished and less well constructed than any others in the building. The beam holes in the southern wall are regular, those in the northern wall less so. The beams used averaged a little smaller than those in the other rooms, and there is no trace whatever in the overhanging wall of the use of rushes or canes in the construction of the roof above. The walls depart considerably from vertical plane surfaces; the southern wall inclines fully 12 inches inward, while in the northeastern corner the side of a doorway projects fully 3 inches into the room. The broken condition of the southern wall indicates carelessness in construction. The weakest point in pisé construction is of course the framing around openings. In the southern wall the openings, being doubtless the first to give way, are now almost completely obliterated. In the center of the wall there were two openings, one above the other, but not a trace of lintels now remains, and the eastern half of the wall now stands clear from other walls. Probably there was also an opening near the southwestern corner of the room, but the lintels giving way the wall above fell down and, as shown on the ground plan (plate LII), filled up the opening. This could happen only with exceptionally light lintels and exceptionally bad construction of walls; one of the large blocks, before described as composing the wall, must have rested directly above the opening, which was practically the same size as the block.

The walls of the eastern room were well finished, and, except the western wall, in fairly good preservation. The floor beams were not placed in a straight line, but rise slightly near the middle, as noted above. The finish of some of the openings suggests that the floor was but 3 or 4 inches above the beams, and that the roughened surface, already mentioned, was not part of it. The northern wall of this room seems to have run through to the outside, on the east, as though at one time it formed the exterior wall of the structure; and the eastern wall of the building north of this room is separated from the rest of the wall by a wide crack, as though it had been built against a smooth surface. The western wall of this room shows clearly that in the con-

struction of the building the floor beams were laid on the tops of the walls, and that the intervening spaces were filled with small lumps of material up to a level with or a little above the upper surface of the beams, the regular construction with large blocks being then resumed.

In the middle room many blocks bearing the imprint of grass and rushes were found, and the rough marking of the walls just above the floor beams is covered in places in this room with masonry composed of these grass marked blocks projecting some distance into the room, indicating that in this room at least they mark the position of a bench. These blocks occupy the whole thickness of the setback at the second roof level—perhaps an indication that the upper story was added after the building was occupied.

OPENINGS.

The Casa Grande was well provided with doorways and other openings arranged in pairs one above the other. There were doorways from each room into each adjoining room, except that the middle room was entered only from the east. Some of the openings were not used and were closed with blocks of solid masonry built into them long prior to the final abandonment of the ruin.

The middle room had three doorways, one above the other, all opening eastward. The lowest doorway opened directly on the floor level, and was 2 feet wide, with vertical sides. Its height could not be determined, as the top was completely broken away and merged with the opening above, but the bottom, which is also the floor level, is 6 feet 9 inches below the level of the first roof beams. The doorway of the second story is preserved only on the northern side. Its bottom, still easily distinguishable, is 1 foot 6 inches above the bottom of the floor beams. It was not over 2 feet wide and was about 4 feet high. The upper doorway is still well preserved, except that the lintels are gone. It is about three inches narrower at the top than at the bottom and about 4 feet high.

In addition to its three doorways, all in the eastern wall, the middle tier of rooms was well provided with niches and holes in the walls, some of them doubtless utilized as outlooks. On the left of the upper doorway are two holes, a foot apart, about 4 inches in diameter, and smoothly finished. Almost directly above these some 3 feet, and about 2 feet higher than the top of the door, there are two similar holes. Near the southern end of the room in the same wall there is another round opening a trifle larger and about 4½ feet above the floor level. In the western wall there are two similar openings, and there is one each in the northern and southern walls. All these openings are circular, of small diameter, and are in the upper or third story, as shown on the elevations herewith, figure 330. The frequency of openings in the upper or third story and their absence on lower levels, except the specially arranged openings described later, supports the hypothesis that none of the rooms except the middle one were ever more than two

SQUARE OPENING IN SOUTH ROOM.

stories high and that the wall remains above the second roof level represent a low parapet.

In the second story, or middle room of the middle tier, there were no openings except the doorway in the eastern wall and two small orifices in the western wall. In the middle of this wall there is a niche about 18 inches below the roof, and a foot below this is a round-cornered opening measuring about 7 by 8 inches extending through the wall. This opening was on a level with another in the western wall of the western room, and commanded a far-reaching though contracted view toward the west. Below and a little northward is a similar though somewhat larger opening corresponding to an opening in the western wall of the western room.

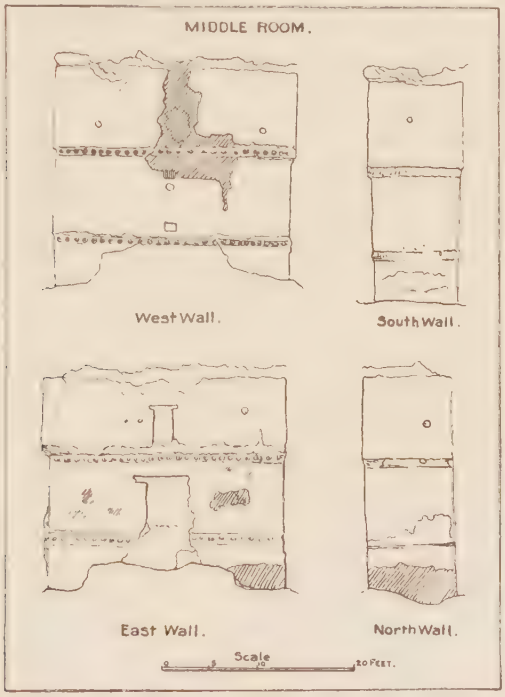


FIG. 330.—Elevations of walls, middle room.

The upper doorway in the western wall of the western room is much broken out, but the top can still be traced. It was 4 feet 5½ inches in height and 1 foot 11 inches wide at top. The opening was blocked by solid masonry built into it and completely filling it up to within 10 inches of the top. This upper space, which is on a level with the upper hole in the middle room, seems to have been purposely left to allow an outlook from that room. The filling block is level on top and flush with the wall inside and out. At a height of 12 inches above the lower edge of the floor beams below it, and perhaps 3 inches above the floor, is the lower edge of a roughly square opening a foot across, cut

out from the block itself and inclined slightly downward toward the exterior. It was plastered and smoothly finished. This opening corresponds to the one in the middle room already described. This filling block, with the orifice under discussion, is shown in figure 330, and in detail in plate LVII

The lower doorway, shown in figure 330, is much broken out, and although now but 2 feet 1½ inches wide at its narrowest part, no trace of the original surface remains on the northern side. The opening was 4 feet 6½ inches high and probably less than 2 feet wide, with vertical sides.

In the western wall of the southern room there was but one opening. This is about 9 inches square, finished smoothly, and occurs in the upper room, about 6 feet 5 inches above the floor. It is shown in plate LVIII. The doorway between this room and the western room was smoothly finished and is in good order except the top, which is entirely gone. It was covered with double lintels made of poles 2 to 4 inches in diameter, the lower series about 3 inches above the top of the door. The opening was originally filled in like that described above, leaving only 8 or 10 inches of the upper part open. The lower part of the block was pierced by a square hole, like that in the western room, but this has weathered or been broken out and the block has slipped down, so that now its top is 1 foot 5½ inches below what was formerly the top of the opening. The top of the filling block is still smooth and finished and shows across its entire width a series of prints probably of flat sticks about an inch and a half wide, though possibly these are marks of some finishing tool. The marks run north and south.

The opening below the one just described was so much filled up at the time of examination that none of its features could be determined, except that it was bridged by two tiers of sticks of the usual size as lintels. The subsequent excavation before referred to, however, apparently disclosed an opening similar to the one described, and, like it, filled nearly to the top with a large block.

A little west of the middle of the northern wall there are three niches, arranged side by side and about 6½ feet above the first roof beams. The niches are 10 inches high, a foot wide, and about a foot deep, and are about 8 inches apart. They are smoothly finished and plastered, but were roughly made.

The eastern opening in the northern wall, opening into the east room, is well preserved except the top, which is missing. It measured 4 feet 2½ inches in height and 1 foot 11 inches wide at the bottom, the top being nearly an inch narrower. It carried two tiers of lintels of medium size.

The gap in the southern wall of the southern room, shown in the plan, though now open from the ground up, represents the location of two doorways, one above the other. Remains of both of these can still be seen on the ends of the walls. No measurements can be obtained.

REMAINS OF LINTELS.

The large fallen block near the southwestern corner of the room, which undoubtedly slipped down from above, shows a finished surface at the ground level inside, but above it no trace of an opening can be seen, possibly because the ends of the walls above are much eroded.

The upper opening in the eastern wall of the eastern room was apparently capped with a single lintel composed of five sticks 4 to 6 inches in diameter laid level on the top of a course of masonry. The bottom of the opening is filled either with washed-down material or with the remains of a block such as that previously described. This opening is the most irregular one in the building, the top being nearly 4 inches narrower than the bottom, but the northern side of the opening is vertical, the southern side only being inclined inward. The opening was 4 feet 11 inches high and 1 foot 8½ inches wide at the bottom. The opening immediately below that described, which was the ground floor entrance from the east, is so much broken out that no evidence remains of its size and character. There appears to have been only one row of lintel poles.

The eastern opening in the southern wall of the northern room is well preserved, the lintels having been torn out by relic hunters without much destruction of the surrounding masonry. It was neatly finished, and its bottom was probably a little above the first roof level. The edges of the openings were made straight with flat sticks, either used as implements or incorporated into the structure, and forming almost perfectly straight edges. Marks of the same method of construction or finish are apparent in all the other openings, but the remains are not so well preserved as in this instance. Possibly the immediate lintels of openings were formed of thin flat sticks, as the lintel poles are often some inches above the top of the opening. In this opening the supporting lintel was formed of a number of poles 2 to 4 inches in diameter, irregularly placed, sometimes two or three in vertical series with very little filling between them. This construction has been characterized as a Norman arch. The opening was originally 1 foot 11 inches at the top and 4 feet 6 inches high. The bottom is 1½ inches wider than the top.

The upper opening in the western end of the southern wall is much like that just described. A small fragment of masonry above the lintel remains, and this is within a quarter of an inch of the top of the opening. Above the opening there was a series of rough lintel poles, 3 to 5 inches in diameter, arranged in three tiers with 4 to 6 inches of filling between them. Prints of these sticks are left in the wall and show that some of them were quite crooked. Probably they were of mesquite, obtained from the immediate vicinity. The edges of the openings were finished with flat sticks, like those described, and its bottom was 6 inches to a foot above the floor. The height of the opening was 4 feet 3 inches and its width at the top 2 feet, at the bottom 2 feet 1¼ inches.

The opening immediately below the last described is filled with débris to the level of the lintel. Above this, however, there is a series of three tiers of sticks with 6 to 8 inches of masonry between them vertically, sometimes laid side by side, sometimes separated by a foot of masonry. Some of these lintel poles, as well as those of the opening above it, extend 3 feet into the wall, others only a few inches. The lower sides or bottoms of the holes are washed with pink clay, the same material used for surfacing the interior walls. Perhaps this was merely the wetting used to make succeeding courses of clay stick better. This opening is shown in plate LIX.

Near the middle of the northern wall there are two openings, one above the other. The upper opening was finished in the same manner as those already described. But two tiers of poles show above it, though the top is well preserved, and another tier may be buried in the wall. There are indications that the opening was closed by a block about 2 feet thick and flush with the outside. The height of the opening was 4 feet 5 inches, width at top 1 foot 4½ inches, and at the bottom 1 foot 10 inches. It narrows a little from north to south.

The lower opening is so much broken out that little remains to show its character. There is a suggestion that the opening was only 2 feet high, and there were probably three tiers of lintels above the opening, the top of which was 2½ feet below the roof beams, but the evidence is not so clear as in the other instances.

In the middle of the western wall, at a height of 5 feet 8 inches above the first roof level, there is a large, roughly circular opening or window, 14 inches in diameter. This is shown in plate LX. It is smoothly finished, and enlarges, slightly, outward.

CONCLUSIONS.

As before stated, any conclusions drawn from a study of the Casa Grande itself, and not checked by examination of other similar or analogous ruins, can not be considered as firmly established, yet they have a suggestive value.

From the character of the remains it seems probable that the site of the ruins here designated as the Casa Grande group was occupied a long time, not as a whole, but piecemeal as it were, one part being occupied and abandoned while some other part was being built up, and that this ebb and flow of population through many generations reached its final period in the occupation of the structure here termed the Casa Grande ruin. It is probable that this structure did not exist at the time the site was first occupied, and still more probable that all or nearly all the other sites were abandoned for some time before the structure now called the Casa Grande was erected. It is also probable that after the abandonment of the Casa Grande the ground about it was still worked by its former population, who temporarily occupied, during the horticultural season, farming outlooks located near it.

CIRCULAR OPENING IN NORTH ROOM.

The methods employed in the construction of the buildings of the Casa Grande were thoroughly aboriginal and characteristically rude in application. A fair degree of adaptability to purpose and environment is seen, indicating that the Casa Grande was one, and not the first, building of a series constructed by the people who erected it and by their ancestors, but the degree of skill exhibited and amount of ingenuity shown in overcoming difficulties do not compare with that found in many northern ruins. As architects, the inhabitants of the Casa Grande did not occupy the first rank among pueblo-builders.

It is probable that the Casa Grande ruin as we see it today shows very nearly the full height of the structure as it stood when it was abandoned. The middle tier of rooms rose to a height of three stories; the others were but two stories high. It is also probable that the building was enlarged after being once completed and occupied. At one time it probably consisted of four rooms on the ground plan, each two stories high. The northern tier of rooms was added afterward, and probably also the third room in the central tier.

The Casa Grande was undoubtedly built and occupied by a branch of the Pueblo race, or by an allied people. Who these people were it is impossible to determine finally from the examination of one ruin, but all the evidence at hand suggests that they were the ancestors of the present Pima Indians, now found in the vicinity and known to have formerly been a pueblo-building tribe. This conclusion is supported by the Pima traditions, as collected by Mr. Bandelier, who is intimately acquainted with the documentary history of the southwest, and whose knowledge of the Pima traditions is perhaps greater than that of anyone else now living. In his various writings he hints at this connection, and in one place he declares explicitly that the Casa Grande is a Pima structure. None of the internal evidence of the ruin is at variance with this conclusion. On the contrary, the scanty evidence is in accord with the hypothesis that the Casa Grande was erected and occupied by the ancestors of the Pima Indians.

OUTLINES OF ZUÑI CREATION MYTHS

BY

FRANK HAMILTON CUSHING

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OUTLINES OF ZUÑI CREATION MYTHS

By Frank Hamilton Cushing

INTRODUCTORY

THE SURVIVAL OF EARLY ZUÑI TRAITS.

During the earlier years of my life with the Zuñi Indians of western-central New Mexico, from the autumn of 1879 to the winter of 1881—before access to their country had been rendered easy by the completion of the Atlantic and Pacific railroad,—they remained, as regards their social and religious institutions and customs and their modes of thought, if not of daily life, the most archaic of the Pueblo or Aridian peoples. They still continue to be, as they have for centuries been, the most highly developed, yet characteristic and representative of all these people.

In fact, it is principally due to this higher development by the Zuñi, than by any of the other Pueblos, of the mytho-sociologic system distinctive in some measure of them all at the time of the Spanish conquest of the southwest, that they have maintained so long and so much more completely than any of the others the primitive characteristics of the Aridian phase of culture; this despite the fact that, being the descendants of the original dwellers in the famous "Seven Cities of Cibola," they were the earliest known of all the tribes within the territory of the United States. Like the other Pueblos, the Zuñians, when discovered, were found living in segregated towns; but unlike the other groups (each separate community of any one of which was autonomous except on rare occasions) they were permanently and closely confederated in both a political and hierarchical sense. In other words, all their subtribes and lesser towns were distinctively related to and ruled from a central tribe and town through priest-chiefs, representative of each of them, sitting under the supreme council or septuarchy of the "master priests of the house" in the central town itself, much as were the divisions and cities of the great Inca dominion in South America represented at and ruled from Cuzco, the central city and province of them all.

It thus happened that, although one or another of the Zuñi subtribes was at different times partially and temporarily conquered by the Spaniards, they were never as a whole people subdued; and, although missions and chapels were ultimately established at one and another of their towns by the Franciscan friars, they were never all of them immediately under mission influence and surveillance at any one time until a comparatively recent date. The evidences and tragic consequences of this may be traced throughout the history of Spanish intercourse, and as the measure of its effect in minimizing the influence of Spanish thought and example on Zuñi culture and habits is of great importance in determining to what extent the following sacred myths may be regarded as purely aboriginal, a brief outline of this history is regarded as desirable.

OUTLINE OF SPANISH-ZUÑI HISTORY.

The first discovered of the Seven Cities of Cibola or Zuñiland, called by the Zuñis themselves Shíwona, was by native account the most easterly of their towns, the K'yä'kime of tradition and the Caquima of later Spanish record. According also to native tradition it was entered by Estevanico, the negro spy of Fray Marcos de Niza, and the Black Mexican of Zuñi story, in the spring of 1539. The negro was forthwith killed by the inhabitants; but the friar, following him shortly after, saw from the mesa heights to the southward one of the seven villages, and, making good his escape, reported his discovery to the viceroy of Mexico, Don Antonio de Mendoza.

Only a year later the largest of the westerly towns, Háwik'uh (Aquico) was stormed and its inhabitants partly subdued, partly driven away to the great tribal stronghold, Thunder mountain, by that valiant knight, Don Francisco Vasquez de Coronado, and his vanguard of hardy mail-clad soldiers. The little army occupied as headquarters, for several months, the town they had captured, and later the more numerous rear of the army were quartered at the more central and eastern town of Mátsaki (Muzaque). During this time Coronado and his comrades in arms were able to reassure and pacify the natives, insomuch that when, two years afterward, they were returning through Zuñiland en route to Mexico from the conquests of the farther Pueblos and their vain search for the golden province of Quivira, they were entreated to remain and join the tribes. But Fray Juan de Padilla, the heroic priest of the expedition, had found more fertile fields to the eastward, and only three or four Mexican Indian allies of the Spaniards were fain to stay.

When, in 1581–'82, Francisco Chamuscado and his 9 soldiers recklessly penetrated those vast and lonely wilds of the southwest (in 1888 I sketched his graven signature and those of many of his successors on El Moro, or the Rock Mesa of Inscriptions, 35 miles east of

Zuñi) and passed through the country of Cibola, he was not hindered by its people. And when Antonio de Espejo, in 1582, with scarcely more of a company, was on his way toward Tusayan or the Hopi country, in the northwest, he stopped at the central town of Alona (Hálona) and was well received. To this day the marks, said by the Zuñis to have been made by the "iron bonnets of his tall warriors," are shown on the rafters of one of the low, still used prehistoric rooms facing the great northern court (once the central and main one) of Zuñi, and attest to the hospitality so long ago accorded them there.

Again, in the autumn of 1598, Juan de Oñate and his more considerable force of soldiers and priests, after their general tour of formal conquest in the other Pueblo provinces, were met as they approached the Zuñi towns by delegations of singing priests and warriors, and were received with such showers of white prayer-meal on entering that they had to protect themselves from these offerings, as they supposed, of peace. This incident, and that of the ceremonial hunt and feast given them afterward, signifies conclusively the estimation in which, up to that time, the Spaniards had been held by the priestly elders of Zuñiland. Precisely as the returning Kâ'kâkwe, or mythic-dance dramatists, personating gods and heroes of the olden time are received twice yearly (before and after the harvest growth and time), so were these soldiers and friars received, not as enemies nor as aliens, but as veritable gods or god-men, coming forth at the close of autumn from out the land of day, whence come the ripening breaths of the Frost gods!

As yet, the Franciscan friars, although sometimes baptizing scores of the Zuñi—much to their gratification, doubtless, as quite appropriate behavior on the part of such beings when friendly,—had not antagonized their ancient observances or beliefs; and the warriors who accompanied them had never, since the first of them had come, and after fighting had laid down their dreadful arms and made peace and left hostages, albeit mortals like themselves, with their forefathers—had never again raised their fearful batons of thunder and fire or their long blades of blue metal like lightning.

But all this was soon to change. When, nearly a quarter of a century later still, Fray Alonzo de Benavides became father-custodian of New Mexico, he undertook to establish missions throughout the country. More than twenty missionaries were introduced into the Pueblo provinces by him, and soon afterward Esteban de Perea brought thirty more from Spain and old Mexico. Among the latter were Fray Martin de Arvide and Fray Francisco de Letrado. Fray Letrado was assigned to Zuñi some time after 1628. By the end of the following year the Indians had built for him at Hálona the little Church of the Purification or of the Immaculate Virgin, and at Háwik'uh the church and conventual residence of the Immaculate Conception.

Fray Francisco was an old man and very zealous. Unquestionably he antagonized the native priests. It is as certain that, at first welcom-

ing him, they gradually came to look upon his religion as no less that of mortal men than their own, and to regard its magic and power of appeal to the gods as of small account in the making of rain or the quelling of war and sorcery. Wherefore, although baptized by dozens as they had been, they brooked but ill the compulsory attendance at mass and other observances and the constant interferences of the father and his soldiers (for a small escort, unluckily, accompanied him) with their own acts of worship. When in the winter of 1630 Fray Martin de Arvide joined Fray Letrado at Háwik'uh, on the way to establish missions among the Zipias, a pueblo people said by the Zuñis to have lived considerably to the southwestward of them at that time, and called by them Tsípiakwe ("People-of-the-coarse-hanging-hair"), he foresaw for his brother and himself speedy martyrdom. He had but fairly departed when, on the Sunday following, the people delayed attending mass, and Fray Francisco, going forth to remonstrate with them, met a party of the native religionists armed with bows and arrows and in mood so menacing that in expectancy of death he knelt where he had stood, clinging to his crucifix, and, continuing to entreat them, was transfixed by many arrows.

Thus speedily was slain the first resident priest of Zuñi; thus were the Zuñis themselves disillusionized of their belief in the more than mortal power of the Spaniard and the deific character of his religion; for they broke up the ornaments of the altar, burned the church, and then sallied forth to follow Fray Martin. They overtook him at night five days later, attacked his party while in camp, overawed and killed outright his two soldiers, and, joined by his traitorous "Christian Indians," one of whom, a half-blood, cut off his hand and scalped him, they killed also this venerable friar and hastened back to their town. There the ceremonial of the scalp dances of initiation were performed over the scalps of the two friars, an observance designed both as a commemoration of victory and to lay the ghosts of the slain by completing the count of their unfinished days and making them members by adoption of the ghostly tribe of Zuñi. The scalp-dance is also supposed to proclaim in song, unto the gods and men, that thenceforward their people are of the enemy, and unto the gods of the enemy that the gods of Zuñi are victors over them, whereof and wherefore it will be well for them to beware. Thus the estimation in which the Spaniard, and especially his religious representatives, were ever afterward to be held was fixed on those fatal days at the close of February, 1630.

Now again, after this demonstration, the Zuñis, as in the days of the great flood, when men had disobeyed the gods, as when Coronado advanced on Háwik'uh, so soon as they had completed the rites of purifying and baptizing the scalps, betook themselves to Thunder mountain and thereon intrenched themselves.

It was not until after two years had passed that they were attacked there, but not overcome, by Tomas de Albizu and his soldiery and

induced by the priests who accompanied him, and whom the Indians, knowing them to be unarmed, allowed to approach, to hold parley. It is probable that Don Tomas, finding it impossible to storm their rock successfully, promised that if they would yield the wretched mestizo who had cut off the hand and torn away the scalp of Fray Martin, he and his people would leave them in peace. At any rate, the mutilator of the friar was yielded, and in due course was hanged by the Spanish authorities.

Then gradually the Zuñis descended from their stronghold and a few years later were peacefully reoccupying the largest four of their towns. More than thirty years elapsed before the missions of the Purification at Hálona and the Immaculate Conception at Háwik'uh were reestablished. In 1670 Fray Juan Galdo was the resident priest at the one, and at the other Fray Pedro de Avila y Ayala. But in the autumn of the year named a numerous band of Apache-Navajo attacked the town of Háwik'uh, and, making for the lower courts where stood the church and convent, they dragged Fray Avila from the altar, at which he had sought refuge, clinging to the cross and an image of the Virgin, and, stripping him, beat him to death with one of the church bells at the foot of the cross in the courtyard hard by. They then plundered and burned the church, threw the image of the Virgin into the flames, and, transfixing the body of the priest with more than 200 arrows, cast upon it stones and the carcasses of three dead lambs. The mutilated corpse was thus found the following day by Fray Galdo and carried to Hálona for sepulture in the Church of the Purification there.

After this tragic occurrence the pueblo of Háwik'uh was abandoned by the missionaries and for a short time at least by its native inhabitants as well. Nevertheless, it seems highly probable that other Zuñis, if not indeed some of the townspeople themselves, had to do with the tragic affair just related, for there is no evidence that, although the people of Háwik'uh were numerous, any of them came to the rescue of the father, or that their town was sacked, whereas the church was plundered and burned.

They do not seem, however, to have done injury to the priest of Hálona, for just previously to the summer of 1680 when they, in common with all the other Pueblo Indians, joined in the revolt against Spanish rule and religion, they were tolerating the presence of Fray Juan de Bal at this town and of another priest, it seems, at Háwik'uh.

When the message strands of that great war magician, Popé of Taos, who had planned the rebellion and sent forth the knotted strings of invitation and warning, were received by the Zuñis, their leaders of one accord consented to join the movement and sped the war strands farther on to the Tusayan country, there insisting with the less courageous Hopi that they join also, and ultimately gaining their at first divided consent.

When all the knots had been numbered and untied, then, to a man, the Zuñis arose to slay Spaniards wheresoever they might encounter them. They forthwith killed Fray Juan de Bal, the priest of Hálona, burning his church and destroying the chapels in the lesser towns round about. Not content with this, they dispatched warriors to the Tusayan country to see to it that the Hopi remain faithful to their promise and vigorously to abet them in its fulfilment.

It fared far otherwise with the priest of Háwik'uh. Although his name is unknown, and although it has been doubted that any other missionary than Fray Juan of Hálona was with the Zuñis at the time, or that the mission of Háwik'uh was ever occupied after the death of Fray Pedro de Avila, yet Vetancurt's chronicles are explicit in stating the contrary, and that, although the Church of the Conception was again burned, the priest escaped. This latter statement is substantially true if we may trust Zuñi tradition, which is very detailed on this point, and which is trustworthy on many another and better recorded point of even remoter date.

The elder Priests of the Bow—three of whom were battle-scarred warriors of nearly a hundred winters at the time of my initiation into their order—told me that one of their gray-robed *tútatsikwe* ("fathers of drink," so named because they used cup-like vessels of water in baptizing), whom their ancients had with them at Háwik'uh in the time of the great evil, was much loved by them; "for, like ourselves," they affirmed, "he had a Zuñi heart and cared for the sick and women and children, nor contended with the fathers of the people; therefore, in that time of evil they spared him on condition"—precisely the rather sweeping condition these same veterans had in 1880 imposed on me ere they would permit of my adoption into one of their clans—"that he eschew the vestment and usages of his people and kind, and in everything, costume and ways of life alike, become a Zuñi; for as such only could they spare him and nurture him." Not so much, I imagine, from fear of death—for the dauntless Franciscan friars of those days feared only God and the devil and met martyrdom as bridegrooms of the Virgin herself—as from love of the Zuñis, if one may judge by the regard they even still have for his memory, and a hope that, living, he might perchance restrain them, alike to the good of their people and his own people, the father gave way to their wishes; or he may have been forced to accede to them by one of those compulsory adoptions of the enemy not uncommonly practiced by the Indians in times of hostility. Be this as it may, the Zuñis abandoned all their towns in the valley, and taking the good priest with them, fled yet again to the top of their high Mountain of Thunder. Around an ample amphitheater near its southern rim, they rebuilt six or seven great clusters of stone houses and renewed in the miniature vales of the mesa summit the reservoirs for rain and snow, and on the crests above the trickling spring under their towns, and along the upper reaches of the giddy trail by which

the heights were scaled they reared archers' booths and heaps of sling-stones and munitions of heavy rocks.

There, continually providing for the conflict which they knew would sooner or later reach even their remote fastnesses (as speedily it began to reach the Rio Grande country), they abode securely for more than ten years, living strictly according to the ways of their forefathers, worshiping only the beloved of war and the wind and rain, nor paying aught of attention to the jealous gods of the Spaniard.

Then at last Diego de Vargas, the reconquistador of New Mexico, approached Zuñiland with his force of foot soldiers and horsemen. The Zuñis, learning this, poisoned the waters of their springs at Pescado and near the entrance to the valley with yucca juice and cactus spines, and, they say, "with the death-magic of corpse shells; so that the horses and men, drinking there, were undone or died of bloating and bowel sickness." In this latter statement the historians of Vargas and the Zuñi traditions agree. But the captain-general could not have stormed the Rock of Cibola. With the weakened force remaining at his command his efforts were doubly futile. Therefore, where now the new peach orchards of the Zuñis grow on the sunlit sand slopes, 800 feet below the northern crest of the mesa their fathers so well defended in those days, Vargas camped his army, with intent to besiege the heathen renegades, and to harass and pick off such stragglers as came within the range of his arquebuses.

Now, however, the good friar whom the Indians called Kwan Tátchui Lók'yana ("Juan Gray-robed-father-of-us"), was called to council by the elders, and given a well-scraped piece of deerskin, whitened with prayer meal, and some bits of cinder, wherewith to make markings of meaning to his countrymen. And he was bidden to mark thereon that the Zuñis were good to those who, like him, were good to them and meddled not; nor would they harm any who did not harm their women and children and their elders. And that if such these captains and their warriors would but choose and promise to be, they would descend from their mountain, nor stretch their bowstrings more. But when they told their gray father that he could now join his people if that by so doing he might stay their anger, and told him so to mark it, the priest, so the legend runs, "dissembled and did not tell that he was there, only that the fathers of the Áshiwi were good now;" for he willed, it would seem, to abide with them all the rest of his days, which, alas, were but few. Then the hide was tied to a slingstone and taken to the edge of the mesa, and cast down into the midst of the watchful enemy by the arm of a strong warrior. And when the bearded foemen below saw it fall, they took it up and curiously questioned it with their eyes, and finding its answers perfect and its import good, they instant bore it to their war captain, and in token of his consent, they waved it aloft. So was speech held and peace forthwith established between them.

That without casualty to the Zuñis an understanding was in some way soon reached between them and Vargas, the chroniclers of the expedition agree with this Zuñi legend; and before the end of the century the Indians had all descended to the plain again and were gathered, except in seasons of planting and harvest, chiefly at three of their easternmost towns, and the central one of Hálona Ítiwana, the Zuñi of today. After the reconquest at least some of the missions were rehabilitated, and missionaries dwelt with the Zuñis now and again. But other chiefs than those chosen by the priestly elders of the people were thenceforward chosen by the Spaniards to watch the people—gobernador, alcalde, and tenientes,—and these in turn were watched by Spanish soldiers whose conduct favored little the fostering of good will and happy relations; for in 1703, goaded to desperation by the excesses of these resident police, the Zuñis drove at least three of them into the church and there massacred them. Then, according to their wont, they fled, for the last time, to the top of Thunder mountain.

When they finally descended they planted numerous peach orchards among the cliffs and terraces of Grand mountain and Twin mountains to the northward of Zuñi, and there also laid out great gardens and many little cornfields. And with the pretext of wishing to be near their crops there, they built the seven Sónoli 'Hlúëlawe (the "Towns of Sonora"), so named because the peach stones they had planted there had been brought from Sonora, Mexico. But their real object was to escape from the irksome and oft-repeated spyings upon and interdictions of their sacred observances and mythic drama-dances, which, as time went on, the Spanish frailes, supported by the increasing power of the authorities at Santa Fé in the first half of the eighteenth century, were wont to make. So, in hidden and lone nooks on the mountains, where their fine foundations may be seen even now, the Indian priests had massive kivas built, and there from year to year they conducted in secret the rites which but for this had never been preserved so perfectly for telling, albeit only in outline, in the following pages. But even thus far from the mission and its warders the plume-wands of worship, which in earlier times had been made long (each one according to its kind as long as from the elbow to the tip of one finger or another of him who made and sacrificed it), now had to be cut short and made only as long as the hands and the various fingers of those who made them; for the large plumed messages to the winds and spaces often betrayed the people, and they must now needs be made of size convenient for burial or hiding away in crannies or under bushes as near as might be to the shrines of the sacred precincts where once the fathers had worshiped so freely.

Toward the end of the century, between 1775 and 1780, the old Church of Our Lady of Guadalupe, which now harbors only burros and shivering dogs of cold winter nights and is toppling to ruin in

the middle of the grand plaza of Zuñi, was built and beautifully decorated with carved altar pieces and paintings, gifts from the King of Spain to the Indies and work of resident monks as well. Its walls were painted—as the more recent plasterings scaling off here and there reveal—by Zuñi artists, who scrupled not to mingle many a pagan symbol of the gods of wind, rain, and lightning, sunlight, storm-dark and tempest, war-bale and magic, and, more than all, emblems of their beloved goddess-virgins of corn-growing with the bright-colored Christian decorations. And doubtless their sedulous teachers or masters, as the case may have been, understanding little, if aught, of the meanings of these things, were well pleased that these reluctant proselytes should manifest so much of zeal and bestow such loving care on this temple of the holy and only true faith.

In a measure the padres were right. The Indians thenceforward did manifest not only more care for the mission, but more readiness to attend mass and observe the various holy days of the church. To be baptized and receive baptismal names they had ever been willing, nay, eager, for they were permitted, if only as a means of identification, to retain their own *tik'ya shíiwe* ("names totemic of the sacred assemblies"), which names the priests of the mission innocently adopted for them as surnames and scrupulously recorded in the quaint old leather-covered folios of their mission and church. Thus it chances that in these faded but beautifully and piously indicted pages of a century ago I find names so familiar, so like those I heard given only a few years since to aged Zuñi friends now passed away, that, standing out clearly from the midst of the formal Spanish phrases of these old-time books, they seem like the voices of the dead of other generations, and they tell even more clearly than such voices could tell of the causes which worked to render the Zuñis of those times apparently so reconciled to Spanish teaching and domination.

For it is manifest that when, as the meaning of his name informs us, the chief priest of the Kâ'kâkwe, or mythic drama-dancers of a hundred years ago, entered the Church of Our Lady of Guadalupe and was registered as "Feliciano Pautiatzanilunquia" (Páutia Tsani Lún-k'ya), or "Felix Of-the-sacred-dancers-glorious-sun-god-youth," neither he nor any of his attendant clan relatives, whose names are also recorded, thought of renouncing their allegiance to the gods of Zuñi or the ever sacred Kâ'kâ; but that they thought only of gaining the magic of purification and the name-potency of the gods of another people, as well as of securing the sanctification if not recognition of their own gods and priests by these other gods and priests.

That this was so is shown also by the sacred character almost invariably of even the less exalted tribal names they gave. Thus, those belonging not to the priesthood, yet to the "midmost" or septuarchial clans, as "Francisco Kautzitihua" (Káutsitiwa), or "Francis Giver of-the-midmost-dance," and "Angela Kahuitietza" (Káwiti Etsa), or

"Angelina Of-the-midmost-dance Little maiden;" and those belonging to yet other clan divisions and the Kâ'kâ, like "Manuel Layatzilunquia" (Laíyatsi Lúnk'ya), or "Emanuel Of-the-flowing plume Glorious-tall-bearer," and "María Laytzitilutza" (Laítsitilutsa), or "Mary Of-the-soft-flowing-plume Little-bearer;" and, finally, even the least sacred but mythically alegoric clan names, such as "Manuel Layujtigua" (Lá-yúhtiwa) or "Emanuel Plume-of-lightness," a name of the Eagle clan and upper division of the tribe; and "Lucia Jayatzemietza," (Haíya Tsemi Étsa) or "Lucy Of-green-growing-things-ever-thinking Little-maiden," which, alluding to the leaves of growing corn and vines when watched by the young unmarried girls, is one of the Corn or Seed clan names belonging to the southern division. Only very rarely were the colloquial names one hears most often in Zuñi (the sacred and totemic names are considered too precious for common use) given for baptismal registration. I have found but two or three. One of these is written "Estévan Nato Jasti" (Náto Hastiŋ) or "Stephen Old-tobacco," a Navajo sobriquet which, in common with the few others like it, was undoubtedly offered reluctantly in place of the "true and sacred name," because some relative who had recently borne it was dead and therefore his name could not be pronounced aloud lest his spirit and the hearts of those who mourned him be disturbed.

But the presence of these ordinary names evidences no less than that of the more "idolatrous" ones, the uncompromisingly paganistic spirit of these supposedly converted Indians, and the unmodified fashion of their thoughts at the period of their truest apparent allegiance, or at least submission, to the church. Hence I have not hesitated to pause somewhat in the course of this introductory sketch to give these examples in detail, particularly as they evidence not merely the exceeding vitality of the native Zuñi cult, but at the same time present an explanation of the strange spectacle of earnest propagandists everywhere vigilantly seeking out and ruthlessly repressing the native priesthood and their dances and other ceremonials, yet, unconsciously to themselves, solemnizing these very things by their rites of baptism, officially recognizing, in the eyes of the Indians, the very names and titles of the officiators and offices they otherwise persecuted and denounced. It was quite of a piece with all this that during the acts of worship performed in the old church at that time by the Zuñis, whilst they knelt at mass or responded as taught to the mysterious and to them magic, but otherwise meaningless, credo, they scattered in secret their sacred white prayer-meal, and invoked not only the souls of their dead priests—who as caciques or rulers of the pueblo were accorded the distinction of burial in the church, under their very feet—but also, the tribal medicine-plumes and fetiches hidden away under the very altar where stood the archenemy of their religion!

So, in following further the Spanish history of Zuñi, we need not be surprised that all went well for a while after the completion of the church,

and that more than twenty priests were at one time and another resident missionaries of Zuñi. Nor, on the other hand, need we be surprised that when in the early part of the present century these missionaries began to leave the pagan surnames out of their registers giving Spanish names instead—began to suspect, perhaps, the nature of the wall paintings, or for some other reason had them whitewashed away—and sought more assiduously than ever, in the deepest hiding places of the many-storied pueblo, to surprise the native priests at their unholy pagan practices, that the records of baptisms in the old books grew fewer and fewer, and that as the secular power withdrew more and more its support of the clergy, the latter could no longer control their disaffected flock, and that finally the old mission had to be abandoned, never again to be reoccupied save on occasions of the parochial visits of priests resident in far-away Mexican towns or in other Indian pueblos.

Nevertheless, although the old church was thus abandoned and is now utterly neglected, there lingers still with the Indians a singular sentiment for it, and this has been supposed to indicate that they retain some conscious remnant of the faith and teachings for which it once stood.

It is true that the Zuñis of today are as eager as were their forefathers for baptism and for baptismal names additional to their own. But it must be remembered that baptism—the purification of the head by sprinkling or of the face by washing with medicine-water, was a very old institution with this people even before the Spaniards found them. With them anyone being named anew or assuming a new personality or office is invariably sprinkled or washed "that he be the more cleanly revealed and the better recommended in his new guise and character to the gods and spirits" invoked for the occasion, "and thus be constantly recognized by them as their child, named of themselves, and so be made a special recipient of their favor." This custom is observed, indeed, on many occasions, as on reaching puberty or before any great change in life, or before initiation into the sacred societies, as well as both before and after war, and especially before and after performance in the sacred dances. The head and face of every participant in these mythic dramas is washed or sprinkled when he is being painted and masked to represent or to assume the presence and personality of the god for whom he is to act or by whom he is to be possessed.

Thus it may be seen that this custom probably had its rise in the simple and necessary act of washing the face for painting before the performance of any ceremony calling for the assumption of a new rôle, and in the washing away of the paint, when the ordinary condition of life was to be resumed after such performance. Thus, too, it may be seen that baptism as practiced by the early Franciscan missionaries must have seemed not only familiar to the Zuñis, but also eminently proper and desirable on occasion of their accepting the benefits of initia-

tion into what they supposed was the Kâ′kâ, or one of the general sacred societies of these other people. No wonder, then, that when about to be baptized they insisted on giving their own sacred names of the Kâ′-kâ, if only as a surety of their full recognition under them in this new Kâ′kâ, no less than under the new names they were about to receive.

It is also true that the Zuñis do not again burn the dead and cast their ashes into the river, nor bury the bodies of the clan elders, or the priests of the tribal septuarchy, in their own houses, as they did ere the time of Coronado, or "under the ladders," as their funereal rituals continue nevertheless to say they do. They bury all, now, in the little strip of consecrated ground out in front of the church; ground already so overfilled with the bones of past generations that never a new grave is made that does not encroach on other graves. Bones lie scattered all about there, rubbish accumulates, the wooden cross in the center of the place is frequently broken, and the mud walls inclosing it are sometimes allowed to fall to the ground. Yet in vain I urged them if only for sanitary reasons to abandon burying their dead there, and inter them in the sand hills to the south of the pueblo. "Alas! we could not," they said. "This was the ground of the church which was the house of our fathers wherein they were buried, they and their children, 'under the descending ladders.' How, if we bury our dead in lone places, may they be numbered with our 'fathers and children of the descending ladders?'"

But far from indicating any lingering desire for "Christian burial," this is a striking example of the real, though not apparent, persistence of their original mortuary customs. For they still ceremonially and ritualistically "burn" their ordinary dead, as did their forefathers when first compelled to bury in the churchyard, by burning some of their hair and personal effects with the customary clan offerings of food and property, and casting the ashes of all into the river; and it matters not where these, who virtually exist no more, but are, in their eyes, consumed and given to the waters, are buried, save that they be placed with the priestly dead of today, as the "children" or ordinary dead were placed with the priestly dead in the days of the "Mísa k'yakwe" or "Mission-house people." So, too, the priests of today, or the tribal fathers, are still painted with the black of silence over their mouths and the yellow and green of light and life over their eyes and nostrils, as are the gods, and are ritualistically buried "under the ladders," that is, in their own houses, when actually buried in the churchyard. Thus, when the gods are invoked, these, as being demigods, still priests of the beloved, are also invoked, first, as "Fathers and children of the descending ladder," then as souls in the clouds and winds and waters, "Makers of the ways of life." So the whole burial ground of the church is, in the estimation of the Zuñi, a fetich whereby to invoke the souls of the ancestors, the potency of which would be destroyed if disturbed; hence the place is neither cared for nor

abandoned, though recognized even by themselves as a "direful place in daylight."

It is much the same with the old church. A few years since a party of Americans who accompanied me to Zuñi desecrated the beautiful antique shrine of the church, carrying away "Our Lady of Guadalupe of the Sacred Heart," the guardian angels, and some of the painted bas-reliefs attached to the frame of the altar. When this was discovered by the Indians, consternation seized the whole tribe; council after council was held, at which I was alternately berated (because people who had come there with me had thus "plundered their fathers' house"), and entreated to plead with "Wasintona" to have these "precious saints and sacred masks of their fathers" returned to them.

Believing at the time that the Indians really reverenced these things as Christian emblems, and myself reverencing sincerely the memory of the noble missionaries who had braved death and labored so many years in the cause of their faith and for the good of these Indians, I promised either to have the original relics returned or to bring them new saints; and I also urged them to join me in cleaning out the old church, repairing the rents in its walls and roof, and plastering once more its rain-streaked interior. But at this point their mood seemed to change. The chiefs and old men puffed their cigarettes, unmoved by the most eloquent appeals I could make, save to say, quite irrelevantly, that I "talked well," and that all my thoughts were good, very good, but they could not heed them.

I asked them if they did not care for their *míssa k'yakwi* or mission-house. "Yea, verily," they replied, with fervor. "It was the sacred place of our fathers, even more sacred than were the things taken away therefrom."

I asked if they would not, then, in memory of those fathers, restore its beauty.

"Nay," they replied, "we could not, alas! for it was the míssa-house of our fathers who are dead, and dead is the míssa-house! May the fathers be made to live again by the adding of meat to their bones? How, then, may the míssa-house be made alive again by the adding of mud to its walls?"

Not long afterward there was a furious night storm of wind and rain. On the following morning, great seams appeared in the northern walls of the old building. I called a council of the Indians and urged that since they would not repair the míssa-house, it be torn down; for it might fall over some day and kill the women and children as they passed through the narrow alley it overshadowed, on their way to and from the spring. Again I was told that my words were good, but alas! they could not heed them; that it was the míssa-house of their fathers! How, if they took it away, would the fathers know their own? It was well that the wind and rain wore it away, as time wasted away their fathers' bones. That mattered not, for it was the work of

the beloved, whereof they, the fathers, were aware, but for themselves to move it suddenly away, that were worse than the despoiling of the shrine; for it was the house of the fathers, the shrine only a thing thereof, not a thing of the fathers as verily as was the house itself.

From their point of view this reasoning of the Indians was perfectly consistent, based as it was on their belief that the souls of their ancestors were mediators and that their mortal remains and the places and things thereof were means of invoking them, quite as sacrifices are supposed to be, for the time being, the mortal and mediate parts of the gods and spirits to which they have been offered, hence a potent means of invoking them. This is shown much more clearly in the only other instance of seeming reverence for the church that I can pause to give.

The Zuñis are careful to remove all traces of Catholicism, or rather all symbols of the Mexican religion, from their persons or vicinity during the performance of their sacred dances or rites, seeing to it that no Mexican word, even, is ever spoken in the presence of the Kâ′kâ. If a Mexican or anyone suspected of being a Mexican happens to approach their town during a ceremonial, he is met by watchful sentinels and led, no matter what his rank, condition, or haste, to some sequestered room, where, although courteously treated and hospitably entertained without charge, he is securely locked up and rigorously guarded until after the dance or other observance is over. "The fathers of these Mexicans did violence to our fathers," say the Indians in explanation, "when that our fathers of old called the sacred Kâ′kâ. Therefore, in those days our fathers sought to hide the dancers from their eyes. Our fathers come nigh in breath, when now we call the Kâ′kâ, and they aid our songs and prayers to the beloved Gods of Rain and Wind. How, if they see we have departed from their customs, and reveal these things? Then will they be sad at our forgetfulness of their ways, and filled with fear lest these evil people, beholding, do sacrilege to their precious Kâ′kâ, and will flee away, nor aid our songs and prayers for rain, nor our calls for their beloved presence!"

Nevertheless, in autumn, when the harvest is over, one may see the dilapidated little figure of Saint Francis borne about the pueblo on the eve of the "Feast of the Dead;" and one may see here and there candles burning, or such poor substitutes for them as the Indians can get; and here and there also old rosaries and a few brass crucifixes revealed. Before they fell, one heard, as the night wore on, the ancient church bells hammered; and half forgotten, wholly unintelligible phrases of church Latin chanted. But all this is not in memory of a "saint's day," as would seem, or as one would be told were he injudiciously to inquire. It is the feast and drama of the beloved dead of all days past. And whilst the dead of long, very long ago, must first be summoned by means of their ancient relics which best they knew—the tribal medicines and fetiches, and the songs to them belonging—yet the

"old ones of the míssa times knew also these things of the míssa; and so, that they be lured near and come not as strangers, but find means of recognition and movement (manifestation) to us, and happily receive our offerings of food to the fire, they must (in place of the summoning songs and drums and rattles) hear the church bells and chants of the Spaniards and see the things which they, perforce, held to most familiarly and with least fear and secrecy in times of festival while yet they lived in daylight."

I need not add that this fully accounts for the contradictory behavior of the Indians in reference to the old church, the burial ground, and other things pertaining to it. The church could not be rebuilt. It had been dead so long that, rehabilitated, it would be no longer familiar to the "fathers" who in spirit had witnessed its decay. Nor could it be taken suddenly away. It had stood so long that, missing it, they would be sad, or might perhaps even abandon it.

The Zuñi faith, as revealed in this sketch of more than three hundred and fifty years of Spanish intercourse, is as a drop of oil in water, surrounded and touched at every point, yet in no place penetrated or changed inwardly by the flood of alien belief that descended upon it. Herein is exemplified anew the tendency of primitive-minded man to interpret unfamiliar things more directly than simply, according to their appearances merely, not by analysis in our sense of the term; and to make his interpretations, no less than as we ourselves do, always in the light of what he already familiarly believes or habitually thinks he knows. Hence, of necessity he adjusts other beliefs and opinions to his own, but never his own beliefs and opinions to others; and even his usages are almost never changed in spirit, however much so in externals, until all else in his life is changed. Thus, he is slow to adopt from alien peoples any but material suggestions, these even, strictly according as they suit his ways of life; and whatever he does adopt, or rather absorb and assimilate, from the culture and lore of another people, neither distorts nor obscures his native culture, neither discolors nor displaces his original lore.

All of the foregoing suggests what might be more fully shown by further examples, the aboriginal and uncontaminated character—so far as a modern like myself can represent it—of the myths delineated in the following series of outlines. Yet a casual visitor to Zuñi, seeing but unable to analyze the signs above noted, would be led to infer quite the contrary by other and more patent signs. He would see horses, cattle and donkeys, sheep and goats, to say nothing of swine and a few scrawny chickens. He would see peach orchards and wheat fields, carts (and wagons now), and tools of metal; would find, too, in queer out-of-the-way little rooms native silversmiths plying their primitive bellows and deftly using a few crude tools of iron and stone to turn their scant silver coins into bright buttons, bosses, beads, and bracelets, which every well-conditioned Zuñi wears; and he would see worn also,

especially by the men, clothing of gaudy calico and other thin products of the looms of civilization. Indeed, if one did not see these things and rate them as at first the gifts to this people of those noble old Franciscan friars and their harder-handed less noble Spanish companions, infinitely more pathetic than it is would be the history of the otherwise vain effort I have above outlined; for it is not to be forgotten that the principal of these gifts have been of incalculable value to the Zuñi. They have helped to preserve him, through an era of new external conditions, from the fate that met more than thirty other and less favored Pueblo tribes—annihilation by the better-armed, ceaselessly prowling Navajo and Apache. And for this alone, their almost sole accomplishment of lasting good to the Zuñi, not in vain were spent and given the lives of the early mission fathers.

It is intimated that aside from adding such resources to the tribe as enabled it to survive a time of fearful stress and danger, even the introduction of Spanish plants, animals, and products did not greatly change the Zuñis. This is truer than would at first seem possible. The Zuñi was already a tiller of the soil when wheat and peaches were given him. To this day he plants and irrigates his peach trees and wheat crops much as he anciently planted and watered his corn—in hills, hoeing all with equal assiduity; and he does not reap his wheat, but gathers it as he gathers his corn in the ear. Thus, only the kind of grain is new. The art of rearing it and ways of husbanding and using it remain unchanged. The Zuñi was already a herder when sheep and goats were given him. He had not only extensive preserves of rabbits and deer, but also herds—rather than flocks—of turkeys, which by day were driven out over the plains and mesas for feeding, and at night housed near the towns or in distant shelters and corrals. It is probable that his ancestry had even other domesticated animals. And he used the flesh of these animals as food, their feathers and fur as the materials for his wonderfully knitted, woven, and twilled garments and robes, as he now uses the mutton and goat meat for food, and the wool of the sheep for his equally well-knitted, woven, and twilled, though less beautiful, garments and robes. Thus, only the kinds (and degree of productivity) of the animals are new, the arts of caring for them and modes of using their products, are unchanged. This is true even in detail. When I first went to live with the Zuñis their sheep were plucked, not sheared, with flat strips of band iron in place of the bone spatulæ originally used in plucking the turkeys; and the herders always scrupulously picked up stray flecks of wool—calling it "down," not hair, nor fur—and spinning it, knitting, too, at their long woolen leggings as they followed their sheep, all as their fore fathers used ever to pick up and twirl the stray feathers and knit at their down kilts and tunics as they followed and herded their turkeys. Even the silversmiths of Zuñi today work coins over as their ancestors of the stone-using age worked up bits of copper, not only using tools

of stone and bone for the purpose but using even the iron tools of the Spaniard mostly in stone-age fashion.[1]

This applies equally to their handling of the hoes, hatchets, and knives of civilized man. They use their hoes—the heaviest they can get—as if weighted, like the wooden and bone hoes of antiquity, vertically, not horizontally. They use their hatchets or axes and knives more for hacking and scraping and chipping than for chopping, hewing, and whittling, and in such operations they prefer working toward themselves to working from themselves, as we work. Finally, their garments of calico and muslin are new only in material. They are cut after the old fashion of the ancestral buckskin breeches and shirts, poncho coats of feathers and fur or fiber, and down or cotton breech clouts, while in the silver rings and bracelets of today, not only the shapes but even the half-natural markings of the original shell rings and bracelets survive, and the silver buttons and bosses but perpetuate and multiply those once made of copper as well as of shell and white bone.

Thus, only one absolutely new practical element and activity was introduced by the Spaniards—beasts of burden and beast transportation and labor. But until the present century cattle were not used natively for drawing loads or plows, the latter of which, until recently being made of a convenient fork, are only enlarged harrowing-sticks pointed with a leaf of iron in place of the blade of flint; nor were carts employed. Burdens were transported in panniers adapted to the backs of burros instead of to the shoulders of men.

The Zuñi is a splendid rider, but even now his longest journeys are made on foot in the old way. He has for centuries lived a settled life, traveling but little, and the horse has therefore not played a very conspicuous part in his later life as in the lives of less sedentary peoples, and is consequently unheard of, as are all new things—including the greatest of all, the white man himself—in his tribal lore, or the folk tales, myths, and rituals of his sacred cult-societies. All this strengthens materially the claim heretofore made, that in mind, and especially in religious culture, the Zuñi is almost as strictly archaic as in the days ere his land was discovered.

OUTLINE OF PRISTINE ZUÑI HISTORY.

If a historic sketch of Spanish intercourse with the Zuñi people indicates that little change was wrought on their native mood by so many years of alien contact, an outline of their pristine history, or a sketch of their growth and formation as a people, will serve yet further to show not only how, but also why, this was so, as well as to explain much in the following outlines of their myths of creation and migration, the meaning of which would otherwise remain obscure.

[1]Some of the primitive Zuñi methods of working metals are incidentally described in my paper entitled "Primitive Copper-working, an Experimental Study," in The American Anthropologist, Washington, January, 1894, pp. 193–217.

Linguistically the Zuñi Indians of today stand alone, unrelated, so far as has heretofore been determined, to any other Indians either sedentary, like themselves, or unsettled, like the less advanced peoples of the plains. Nevertheless, although they as yet thus constitute a single linguistic stock, there are present and persistent among them two distinct types of physique and numerous survivals—inherited, not borrowed—of the arts, customs, myths, and institutions of at least two peoples, unrelated at first, or else separate and very diversely conditioned for so long a period of their preunited history that their development had progressed unequally and along quite different lines, at the time of their final coalition. That thus the Zuñis are actually descendants of two or more peoples, and the heirs of two cultures at least, is well shown in their legends of ruins and olden times, and especially in these myths of creation and migration as interpreted by archeologic and ethnographic research.

According to all these tokens and evidences, one branch of their ancestral people was, as compared with the other, aboriginal in the region comprising the present Zuñi country and extending far toward the north, whence at some remoter time they had descended. The other branch was intrusive, from the west or southwest, the country of the lower Rio Colorado, their earliest habitat not so clearly defined and their remoter derivation enigmatical, for they were much more given to wandering, less advanced in the peaceful arts, and their earliest ruins are those of comparatively rude and simple structures, hence scant and difficult to trace, at least beyond the western borders of Arizona. Considering both of these primary or parental stocks of the Zuñi as having been thus so widely asunder at first, the ancestral relations of the aboriginal or northern branch probably ranged the plains north of the arid mountain region of Utah and Colorado ere they sought refuge in the desert and canyons of these territories. Yet others of their descendants, if still surviving, may not unlikely be traced among not only other Pueblos, but also and more distinctly among wilder and remoter branches, probably of the Shoshonean stock. The ancestral relations of the intrusive or western branch, however, were a people resembling the semisettled Yumans and Pimans in mode of life, their ruins combining types of structure characteristic of both these stocks; and if their descendants, other than Zuñis themselves, be yet identified among Yuman tribes, or some like people of the lower Colorado region, they will be found (such of them as survive) not greatly changed, probably, from the condition they were all in when, at a very distant time, their eastward faring kinsfolk, who ultimately became Zuñis, left them there.

It is quite certain that relatives, in a way—not ancestral—of the Zuñis still exist. Not many years before Fray Marcos de Niza discovered Cibola, the Zuñians conquered some small towns of the Keres to the south-southeastward of the Zuñi-Cibola country, and adopted some of the survivors and also some of their ritual-dramas—still per-

formed, and distinctively Keresan in kind—into their own tribe. Previously to that—previously, indeed, to their last and greatest union with the settled people mentioned as the aboriginal Zuñi—a large body of the western branch and their earlier fellows (called in the myths of creation "Our lost others") separated from them in the country south and west of the Rio Puerco and the Colorado Chiquito, and went, not wholly as related in the myths, yet quite, undoubtedly, far away to the southward. I have identified and traced their remains in Arizona toward and into Mexico as far as the coast, and if, as the Zuñis still believe, any of them survive to this day, they are to be looked for lower down in Mexico or in the still farther south, whither, it is said, they disappeared so long ago. But, as before intimated, these relatives (by adoption in the one case, by derivation in the other) were not, strictly speaking, ancestral, and thus are barely alluded to in the myths, and therefore concern us less than do the two main or parental branches.

Of these, the one which contributed more largely in numbers, certain culture characteristics, and the more peaceful arts of life to make the Zuñis what they were at the time of the Spanish conquest, was the aboriginal branch. The intrusive or western branch is, strange to say, although least numerous, the one most told of in the myths, the one which speaks throughout them in the first person; that is, which claims to be the original Shíwi or Zuñi. Of this branch it is unnecessary to say much more here than the myths themselves declare, save to add that it was, if not the conquering, at least, and for a long time, the dominant one; that to it the Zuñis owe their vigor and many, if not most, of their distinguishing traits; and that, coming as they did from the west, they located there, and not in the north, as did all these other Pueblo Indians (including even those whom they found and prevailed over, or were joined by, in the present land of Zuñi), the place where the human family originated, where the ancestral gods chiefly dwell, and whither after death souls of men are supposed to return anon.

According to their own showing in the myths they were, while a masterful people, neither so numerous at the time of their coming, nor so advanced, nor so settled, as were the peoples whom they "overtook" from time to time as they neared the land of Zuñi or the "Middle of the world." They did not cultivate the soil, or, at least, apparently did not cultivate corn to any considerable extent before they met the first of these peoples, for, to use their own words, they were "ever seeking seeds of the grasses like birds on the mesas."

There is abundant reason for supposing that the "elder nations"—these peoples whom they "overtook," the "People of the Dew," the "Black people," and the "Corn people" of the "towns builded round"—were direct and comparatively unchanged descendants of the famous cliff dwellers of the Mancos, San Juan, and other canyons of Utah, Colorado, and northern New Mexico. The evidences of this are numerous and detailed, but only the principal of them need here be examined.

The ruins of these rounded towns of the Corn tribes which Hernando de Alvarado and Fray Juan de Padilla saw in 1540 while going southeastward from Zuñi, are especially characteristic of the Zuñi region, and extend quite generally both southward toward the Rito Quemado and the Salinas in western central New Mexico, and, by way of the Chaco, northward nearly to the Colorado boundary. They are as often half round as they are wholly oblong or circular, and even when completely rounded or oval in outline are usually divided into two semicircular parts by an irregular court or series of courts extending lengthwise through the middle, and thus making them really double villages of the half-round type.

A comparison of the ground plans of these round or semicircular ruins with those of the typical cliff ruins reveals the fact that they were simply cliff towns transferred, as it were, to the level of the open plains or mesa tops. Their outer or encircling walls were, save at the extremities of the courts, generally unbroken and perpendicular, as uninterrupted and sheer, almost, as were the natural canyon walls surrounding to the rearward the older cliff towns to which they thus corresponded and which they apparently were built to replace; and the houses descended like steps from these outer walls in terraced stories, facing, like the seats of an amphitheater, the open courts, precisely as descended the terraced stories of the cliff dwellings from the encircling rock walls of the sheltered ledges or shelves on which they were reared, necessarily facing in the same manner the open canyons below. Thus the courts may be supposed to have replaced the canyons, as the outer walls replaced the cliffs or the back walls built nearest them in the rear of at least the deeper village caves or shelters.

Other structural and kindred features of the cliff towns are found to be equally characteristic of the round ruins, features which, originating in the conditions of building and dwelling in the cliffs, came to be perpetuated in the round towns afterward built on the plains.

So limited was the foothold afforded by the scant ledges or in the sheltered but shallow hollows of the cliffs where the ancient cliff dwellers were at first forced as a measure of safety to take refuge and finally to build, that they had to economize space to the utmost. Hence in part only the women and children, being smaller and more in need of protection than the men, were accommodated with dwelling places as such, the rooms of which were so diminutive that, to account for them, theories of the dwarfish size of the cliff dwellers as a race have been common. As a further measure of economy these rooms were built atop of one another, sometimes to the height of several stories—up, in fact, to the very roof at the rear of the cavern in most cases—and thence they were terraced toward the front in order that light and air might be admitted as directly as possible to each story.

For the double purpose of accommodating the men and of serving as assembly rooms for councils and ceremonial functions, large circular

chambers were constructed almost always out in front of the terraced dwelling cells of the women and children, and thus in the more exposed mouths of the caverns or shelters the villages nestled in. These round assembly rooms or kivas were often, indeed, built up from sloping portions of the sheer outer edge of the village cave shelf, in order to be as much as possible on a level with or even below the limited ground space between them and the houses farther back, so that the front along the lower and outermost row of these house cells might remain open and unobstructed to passage.

The dwelling rooms or house cells themselves were made as nearly rectangular as was practicable, for only partitions divided them; but of necessity such as were placed far back toward or against the encircling and naturally curved rock walls, or the rear masonry walls, built in conformity to their curvature in all the deeper caves, had small triangular or keystone-shape spaces between their partitions. These, being too small for occupancy even by children, were used as storerooms for grain and other household supplies. When the cave in which a village was built happened to be very deep, the living rooms could not be carried too far back, as neither light nor sufficient air could reach them there; hence here, chiefly against the rear wall or the cave back itself, were built other storerooms more or less trapezoidal in shape, according to the degree of curvature in the rock face against which they were built, or, as said before, of the rear wall itself, which in the deeper caves often reached from floor to roof and ran parallel to the natural semicircular back of the cavern.

Against the rearward face of such back walls when present (that is, between them and the rear of the cave itself), behind the village proper, if space further permitted, small rooms, ordinarily of one story, or pens, sometimes roofless, were built for the housing of the flocks of turkeys which the cliff dwellers kept. Beyond these poultry houses was still kept, in the deeper village caves, a space, dark and filled with loose soil and rubbish, in which certain of the dead, mostly men, were buried; while other dead were interred beneath the floors of the lowermost rooms, when the soil or sand filled in to level up the sloping rock bottom of the shelter was sufficiently deep to receive them.

A noteworthy peculiarity of the doorways in the upper stories leading toward the rearward storerooms already described was that they were often made T-shape; that is, very narrow at the bottom and abruptly widened at the top. This was done in order to avoid the necessity of making these openings for entrance and egress too large proportionally to the small size of the rooms. Thus, neither were the walls weakened nor were the inmates needlessly exposed to cold; for fuel, even of the lightest kind, was gathered with risk and transported thither with great difficulty, and the use of it was therefore limited to cookery, and yet a person bearing a back load of corn or other provender might, by stepping first one foot, then the other, through the narrow lower portion

of such a doorway, then stooping with his blanket or basket load, pass through without inconvenience or the necessity of unloading.

Nearly all of these features—so suited to, and some of them evidently so unavoidable with, a people building eyrie-like abodes high up on limited sloping ledges in pockets of the cliffs—were, although they were totally unnecessary to the dwellers in the half-round or double half-round towns of the plains, where space was practically unlimited and topographic and other conditions wholly different, nevertheless characteristic of these also.

Not only were the external walls of these old villages of the plains semicircular, as though built in conformity with the curved rock walls of the hollows in the cliffs, but they were continuous. That is, in all the rounded town ruins, except those which seem to have been reconstructed in more recent times, the outer walls were built first as great semicircular inclosures, hollow artificial cliffs, so to say, and afterward the house walls were built up against them inside, not into them, as they would have been had these outer and the inner walls been built up together. Moreover, not only were the ground plans of these towns of the plains semicircular, as though built in conformity with the curved rock walls of hollows in the cliffs in ancestral fashion, but the storerooms were also still tucked away in the little flaring spaces next to these now outer and surrounding walls, instead of being placed near the more convenient entrances fronting the courts. The huts or sheds for the turkeys, too, were placed not in the inclosures of the courts, but against and outside of these external walls of the villages; and while many of the dead were buried, as in the cliff houses, under the floors of the lowermost rooms, others of them, almost always men, and notably victims of war or accident, were still buried out beyond even the turkey huts. So both the turkey huts and some of the graves of these round villages retained the same positions relative to one another and to the "rearward" of the dwellings that had very naturally been given them in the cliff villages; for in these, being behind the houses and in the rear of the caves, they occupied the most protected areas; while in the round villages, being behind the houses, they were thrown quite outside of the villages, hence occupied the most exposed positions, which latter fact would appear inexplicable save by considering it as a survival of cliff-town usage.

The kivas, or assembly rooms of the round villages, were placed generally in front of the houses facing the courts, as of old they had been built in the mouths of the caverns, also in front of the houses facing the canyons. Moreover, they were, although no longer in the way, wholly or in part subterranean, that is, sunk to the level of the court or plaza, as in the cliff towns they had been built (except where crowding rendered it necessary to make them two-storied, as in some cases) up the front slopes only to the height of the general cave floor or of the lowermost house foundations.

Finally, there were no doorways in the lower stories of the rounded villages, the roofs of which were reached by ladders; but in the upper stories there were passages, some of which, although here no longer so needfully small, were still economically fashioned as of old—wide at the top, narrow at the base, like the T-shape granary avenues of the cliff ruins.

The closeness of correspondence of all these features in the round ruins to those in the cliff ruins (features which in the round ruins appear less in place than in at least the older cliff ruins) would seem to justify my conclusion, earlier stated, that the round towns were simply outgrowths of the cliff villages, transplanted, as it were, into the plains; for all of these features, as they occur in the old cliff ruins, can, with but a single exception (that of the circular form of the kivas or assembly chambers, which, as will presently be shown, were survivals of a yet older phase of building), be accounted for as having originated from necessity, whereas in the round ruins they could not have originated even as possible expedients, since they were unsuitable save by having become customary through long usage.

I have reasserted this fact because the theory that all cliff dwellings were but outlying places of refuge or the hunting and farming stations of larger pueblos in their neighborhood, strongly fortified by position in order that the small parties occupying them now and then for longer or shorter seasons might find safe retreat in them, has been advanced quite successfully. As this theory is not unlikely to gain a considerable hearing, it is necessary to demonstrate even more fully the fact that at least the round towns did not give their structural characteristics to such of the northern cliff ruins as resembled them in plan, and that therefore the latter are to be regarded as actual cliff-dweller remains. In the southern portions of New Mexico and Arizona, as on the upper Salado and in canyons of the Sierra Madre, still farther south, all the cliff dwellings and villages were built without reference to the curved forms of the caverns in which they occurred.[1] That is, they rigidly retained the rectangular pueblo form of arrangement characteristic of the larger ruins in the valleys and plains around them. Hence for this and for other reasons they may be regarded as pueblos transferred to the cliffs, such outposts of the larger pueblos of the plains as it is claimed all cliff dwellings were. So, also, as hitherto intimated, many of the later cliff dwellings, even of the north, have rectangular pueblo additions below them in the canyons or above them on the mesas, and some of the village ruins in the cave shelters themselves are almost faithful miniature reproductions in general plan of the large pueblos of the plains near at hand; but in the one case the pueblo additions above and below were comparatively modern, and indicate either that the cliff dwellings they are adjacent to continued

[1] See Bandelier, Final Report of Investigations among the Indians of the Southwestern United States, etc., Part II, pp. 425–428.

to be occupied down to the time of later true pueblo building, or that they were reoccupied from comparatively modern pueblos and that all additions made were constructed according to customary later forms of building. In the other case, that of the rectangular structures in semicircular cave shelters, either a return to cliff dwelling from pueblo dwelling is indicated, or, as with the southern cliff villages, these also were outposts of comparatively modern kinds of pueblos occurring in the neighborhood. Such, for example, was the case with many of the cliff dwellings of the Tsegi or Canyon de Chelly, some of which continued to be occupied long after the more easterly towns of the San Juan were abandoned, and others of which were reoccupied, probably by Tusayan Indians, in comparatively recent time.

The occurrence of sepulchers in or near almost all the San Juan cliff ruins would alone indicate that they were central and permanent homes of the people who built and occupied them. The surviving Pueblo Indians, so far as I am aware, never bury in or near their outlying towns. Invariably the dead are taken to the central pueblo home of the tribe for sepulture, as there only may they become tribal fetiches in the manner I have heretofore indicated, and be properly renounced by the clans of kin at their place of birth and rearing. If, then, all the cliff towns were merely outlying strongholds, no interments of the original inhabitants would be found in them save those of children perchance born and reared in them. In fact, this is precisely the case with some of the towns in question, those above described as manifestly settlements from later true pueblos.

Another feature of the older cliff dwellings is still more significant in this connection—the presence of the kiva; for the kiva or sacred assembly room was never, for mythic and sociologic reasons, built in temporary or outlying settlements. The mere council chamber was sometimes present in these, but the true kiva never, so long as they remained resorts of more central pueblo towns, for each kiva of such a town located a division of the tribe as pertaining to one or another of the quarters or mythic divisions. Hence, as might be expected, in the more southerly cliff dwellings belonging to more recent pueblos no kiva is ever found.

The evidence furnished by the kivas is significant in other ways, for in connection with the above theory the claim has also been advanced that the cliff villages were occupied for only brief periods at best; that they do not, as assumed by me, represent a phase—so much as an incident—in the development of a people. Aside from the linguistic, sociologic, and other evidence I have to offer later on that of not only these kivas, but also of certain other features of the ruins themselves, is decidedly indicative of both long and continuous occupancy; and an examination of this evidence helps to an understanding of the culture growth of the early cliff dwellers as being not that of Pueblos at first, but that of Pueblo ancestry, Pueblos developing.

Occurring in the midst of the greater groups of northern cliff dwellings, no less than somewhat more scatteringly and widely distributed to at least as far south as the middle of Arizona, are remains of cave dwellings of an older type. They are usually lower down in the cliffs, although they once occurred also in the larger and more accessible of the caverns now occupied by later cliff-house remains, underneath or amid which remains they may still in places be traced. These rude and very ancient cave dwellings mark the beginnings of the cliff occupancy. In all essentials they correspond to the modern cave dwellings of the Sierra Madre in Sonora, Mexico, so admirably described by my friend, Dr. Carl Lumholtz, as built and still lived in by the Tarahumári and Tepehuani Indians, who survive either in the state of these first cliff dwellers of the north, or, as is more probable, have naturally and independently resorted to a similar mode of life through stress of similar circumstances.

Like the Tarahumári, these ancient people of the north at first resorted to the caves during only portions of the year—during the inclement season after each harvest, as well as in times of great danger. At other times, and during the hunting, planting, and seed-gathering seasons particularly, they dwelt, as do the Tarahumári, in rancherias, the distinctive remains of which lie scattered near and far on the plateaus and plains or in the wide valleys. But the caves were their central abodes, and the rancherias, frequently shifted, were simply outlying stations such as are the farming hamlets of the modern pueblos.

The earliest of these dwellings in the caves were at first simple huts disposed separately along the rear walls of these recesses in the cliffs. They usually had foundation walls, approximately circular in plan, of dry-laid stones, upon which rested upper converging courses of cross-laid logs and sticks, hexagonal and pen-like covers surmounted, as were the rancherias of the open plains, by more or less high-pitched roofs of thatch—here in the shelters added rather for protection from cold than from storms of rain and snow.

But in course of time, as the people dwelling, when needful, in these secure retreats increased in numbers, and available caves became filled, the huts, especially in the more suitable shelters, were crowded together in each, until no longer built separately, but in irregularly continuous rows or groups at the rear, each divided from others by simple, generally straight, partitions, as are the dwelling divisions of the Tarahumári today. But unlike the latter, these hut-like rooms of the northern cave-dwellers were still rounded outwardly, that is, each hut (where not contiguous to or set in the midst of others, as was the case with those along the front), retained its circular form. The partitions and foundation walls were still built low, and still surmounted by converging cross-laid upper courses of logs or saplings and roofs of thatch. As with the Tarahumári, so with these earliest cliff dwellers of the north; their granaries were far more perfectly constructed than their own abiding

places. To adequately protect their store or provision from seed-devouring animals, no less than from the elements, it became necessary to place it in dry crannies or pockets of the cliffs near at hand, preferably in recesses as far back in their caves as possible, and also to seal it up in these natural receptacles. At first (as may be seen in connection with the caves of Las Tusas, Arizona, containing some of the oldest and rudest separate hut remains I have yet examined) the mouths of these receptacles were walled up with dry-laid stones, carefully chinked, and plastered inside with mud, precisely as were the granary pockets of the Havasupai Indians seen by me in 1881. Later, while still the houses continued to be mere low-walled and partitioned sheds or huts of dry masonry, these granaries came to be quite well constructed, of mud-laid walls, and were enlarged, as stores increased with increase of settlement and tillage, until they had to be built outward from the niches like good sized, slightly tapering bins, protruding somewhat from the cave walls, and finally forming, as do the granaries of the Tarahumári today, miniature prototypes of the perfected single cliff house of a far later day.

In times of great danger small children were not infrequently bestowed for safe-keeping in the larger of these little granary rooms in the deepest recesses at the rear of the earliest cave villages, as the finding of their remains without burial token in such situation has attested; and thus the folk tales which modern Pueblos tell of children left in the granary rooms and surviving the destruction or flight of their elders by subsisting on the scant store remaining therein (later to emerge—so the stories run—as great warrior-magicians and deliver their captive elders), are not wholly without foundation in the actual past of their ancestry. It was thus that these first cliff dwellers learned to build walls of stone with mud mortar, and thus, as their numbers increased (through immunity from destruction which, ever better, these cliff holds afforded), the women, who from the beginning had built and owned the granaries, learned also to build contiguously to them, in the depths of the caverns, other granary-like cells somewhat larger, not as places of abode, at first, but as retreats for themselves and their children.

It is not needful to trace further the development of the cliff village proper into a home for the women and children, which first led to the tucking of storerooms far back in the midst of the houses; nor is it necessary to seek outside of such simple beginnings the causes which first led to the construction of the kivas, always by the men for themselves, and nearly always out in front of the house cells, which led to the retention for ages of the circular form in these kivas and to the survival in them for a long time (as chambers of council and mystery, where the souls of the ancients of men communed in these houses of old with the souls of their children's grandchildren) of the cross-laid upper courses of logs and even the roofings of thatch. Indeed, it is only in some way like this, as survival through slow evolution of archaic structures for worship,

that the persistence of all these strange features—the retention for use of the men, the position in front of the houses, the converging hexagonal log wall caps, the unplastered roofing of thatch—until long after the building of houses for everyday use by the women, with walls continuous from floor to ceiling, with flat and mud-plastered roofs and smooth finishing inside and out, manifest themselves.

Of equal significance with this persistency of survival in the kiva, as to both structural type and function, of the earliest cave-dwelling hut-rooms through successively higher stages in the development of cliff architecture, is the trace of its growth ever outward; for in nearly or quite all of the largest cliff ruins, while as a rule the kivas occur, as stated, along the fronts of the houses—that is, farthest out toward the mouths of the caverns—some are found quite far back in the midst of the houses. But in every instance of this kind which I have examined these kivas farthest back within the cell cluster proper are not only the oldest, but in other ways plainly mark the line of the original boundary or frontage of the entire village. And in some of the largest of these ruins this frontage line has thus been extended; that is, the houses have grown outward around and past the kivas first built in front of them, and then, to accommodate increased assemblies, successively built in front of them and in greater numbers, not once or twice, but in some cases as many as three, four, and in one instance five times.

All this makes it plain, I think, that the cave and cliff dweller mode of life was a phase, not an incident merely, in the development of a people, and that this same people in general occupied these same caves continuously or successively for generations—how long it is needless here to ask, but long enough to work up adaptively, and hence by very slow degrees, each one of the little natural hints they received from the circumstances and necessities of their situation in the caves and cliffs into structural and other contrivances, so ingenious and suitable and so far-fetched, apparently, so long used, too, as to give rise to permanent usages, customs, and sociologic institutions, that it has been well-nigh impossible to trace them to such original simple beginnings as have been pointed out in the case of a few of them.

The art remains of both the earliest cave dwellers and of the cliff dwellers exhibit a like continuity of adaptive development; for even where uses of implements, etc., changed with changing conditions, they still show survivals of their original, diverse uses, thus revealing the antecedent condition to which they were adapted.

Moreover, this line of development was, as with the structural features already reviewed, unbroken from first to last—from cave to cliff, and from cliff to round-town conditions of life; for the art remains of the round ruins, of which I recovered large numbers when conducting the excavations of the Hemenway expedition in ruins east of Zuñi, are with scarcely an exception identical, in type at least, with those of the cliff ruins, although they are more highly developed, espe-

cially the potteries, as naturally they came to be under the less restricted, more favorable conditions of life in the open plains. Everything, in fact, to be learned of the round-ruin people points quite unmistakably to their descent in a twofold sense from the cliff-dwelling people; and it remains necessary, therefore, only to account for their change of habitat and to set forth their supposed relationship finally to the modern Zuñi pueblos.

In earlier writings, especially in a "Study of Pueblo Pottery,"[1] where the linguistic evidence of the derivation of the Zuñis from cliff-dwelling peoples is to some extent discussed, I have suggested that the prime cause of the abandonment of the cliffs by their ancestry was most probably increase of population to beyond the limits of available building area, and consequent overcrowding in the cliffs; but later researches have convinced me that, although this was no doubt a potent factor in the case and ultimately, in connection with the obvious advantages of life in more accessible dwelling places, led by slow degrees, as the numbers and strength of the cliff villages made it possible, to the building of contiguous pueblos both above their cliffs on the mesas and below them in the valleys, still it was by no means the only or the first cause of removal from these secure strongholds. Nor is it to be inferred from the evidence at hand that the cliff dwellers were ever driven forth from their almost inaccessible towns, either by stress of warfare or by lack of the means of subsistence, as has been so often supposed. On the contrary, it is certain that long after the earliest descents into the plains had been ventured, the cliffs continued to be occupied, at first and for a very long period as the permanent homes of remnant tribes, and later as winter resorts and places of refuge in times of danger for these latter tribes, as well as, perhaps, for their kinsfolk of the plains.

It is by this supposition only that the comparatively modern form of the square and terraced pueblos built contiguously to the latest abandoned of the cliff towns may be explained. For when the cliff dwellers had become numerous enough to be able to maintain themselves to some extent out on the open plains, it has been seen that they did not consider their villages safe and convenient or quite right unless builded strictly, in both general form and the relative arrangement of parts, as had been for many generations their towns in the cliffs—did not, it is reasonable to suppose, know at once how to build villages of any other form. Thus we may confidently regard these round towns as the earliest built by the cliff dwellers after they first left the cliffs.

The direction in which these cavoid or cliff-form or rounded village ruins may be farthest and most abundantly traced, is, as has been said before, to the southward into and through the land of Zuñi as far as the cliffless valleys bordering the Rito Quemado region in southerly central New Mexico, wherein lies the inexhaustible Lake of Salt, which

[1] Fourth Annual Report of the Bureau of Ethnology, 1882–83.

the early Spanish chronicles mention as the possession and source of supply of the "salt in kernels" of the Zuñi-Cibolans.

Not only did a trail (used for such long ages that I have found it brokenly traceable for hundreds of miles) lead down from the cliff-town country to this broad valley of the Lake of Salt, but also there have been found in nearly all the cliff dwellings of the Mancos and San Juan section, whence this trail descends, salt in the characteristic kernels and colors found in this same source of the Zuñi supply.

This salt, as occurring in the cliff ruins, is commonly discovered wrapped in receptacles of corn husk, neatly tied into a trough-like form or pouch by bands of corn-leaf or yucca fiber. These pouches are precisely like the "wraps of the ancients," or packs of corn husk in which the sacred salt is ceremoniously brought home in advance of the cargoes of common salt by the Zuñi priests on each occasion of their annual, and especially of their greater quadrennial, pilgrimages (in June, after the planting) to the Lake of Salt. And it is not difficult to believe that both the packs and the pilgrimages—which latter offer many suggestive features not to be considered here—are survivals of the time when the remoter cliff-dwe ling ancestry of the Zuñi Corn tribes ventured once in a period of years to go forth, in parties large enough for mutual protection, to the far-off source of their supply of salt.

Except this view be taken it is difficult to conceive why the "time after planting" should have become so established by the Zuñis (who are but two days' foot-journey from the lake, and visit its neighborhood at other periods of the year on hunting and other excursions) as the only period for the taking of the salt—to take which, indeed, by them or others at any other season, is held to be dire sacrilege.

But to the cliff dwellers and their first descendants of the farther north this period "after the planting" was the only available one of the year; for the journey along their trail of salt must have consumed many days, and been so fraught with danger as to have drawn away a goodly portion of the warrior population who could ill be spared at a later time in the season when the ripening and garnering of the harvest drew back upon the cliff-towns people the bands of predatory savages who annually pillaged their outlying fields, and in terror of whom they for so long a time clung to their refuge in the cliffs.

Additional considerations lead further to the inference not only that the Zuñis inherit their pilgrimages for the salt and the commemorative and other ceremonials which have developed around them directly from the cliff-dweller branch of their ancestry, but also that these latter were led down from the cliffs to build and dwell in their round towns along the trail of salt chiefly, if not wholly, by the desire to at once shorten and render less dangerous their communal expeditions to the Lake of Salt and to secure more exclusive possession thereof.

These two objects were rendered equally and the more desirable by the circumstance, strongly indicated by both the salt remains them-

selves and by usages surviving among the present Zuñis, that in course of time an extensive trade in salt of this particular variety grew up between the cliff dwellers and more northern and western tribes. When found by the Spaniards the Zuñi-Cibolans were still carrying on an extensive trade in this salt, which for practical as well as assumed mythic reasons they permitted no others to gather, and which they guarded so jealously that their wars with the Keresan and other tribes to the south-southeastward of their country were caused—as many of their later wars with the Navajo have been caused—by slight encroachments on the exclusive right to the products of the lake to which the Zuñis laid claim.

The salt of this lake is superior to any other found in the southwest, not excepting that of the Manzano salinas, east of the Rio Grande, which nevertheless was as strenuously fought for and guarded by the Tanoan tribes settled around these salinas, and had in like manner, indeed, drawn their ancestry down from earlier cavate homes in the northern mountains. Hence it was preferred (as it still is by both Indian and white population of New Mexico and Arizona) to all other kinds, and commanded such price that in the earlier cliff-packs I have found it adulterated with other kinds from the nearer salt marshes which occur in southern Utah and southwestern Colorado. That the adulteration of the lake salt with the slightly alkaline and bitter salt of the neighboring marshes was thus practiced with a view to eking out the trade supply is conclusively shown, I think, by the presence in the same cliff homes from which the adulterated specimens were obtained, of abundant specimens of the unadulterated salt, and this as conclusively shows not only that the cliff dwellers traded in this salt, as do their modern Zuñi representatives, but also that it was then, as now, more highly valued than other kinds of salt in the southwest.

The influence on the movements of whole tribes of people which it is here assumed such a source of favorite salt supply as this exerted over the early cliff dwellers, does not stand alone in the history of American tribes. It already has been intimated that the Tanoans so far prized their comparatively inferior source of salt supply in the salinas of the Manzano as to have been induced to settle there and surround them with a veritable cordon of their pueblos.

Another and far more significant instance, that of the Cerro de Sal in Peru may be mentioned, for in that country not only was salt of various kinds to be found in many valleys and throughout nearly all the deserts of the Medano region extending from northern Ecuador to southern Chili, but the sea also lay near at hand along the entire western border of this vast stretch of country; yet from remote parts of South America trails lead, some from the Amazon and from Argentina, more than a thousand miles away, some from nearer points and from all local directions to this famous "Cerro de Sal." The salt from this locality was, like that of the Lake of Salt, so highly prized that it

drew aboriginal populations about it in even pre-Incan days, and was a source of supply, as well as, it is affirmed, of abundant tribute to those dominant Pueblos of South America, the Incas of later days.[1]

That the Lake of Salt, as a coveted source, actually did influence the earlier descents of the cliff dwellers, and did lead to the building and occupancy by them of the long line of ruins I have described, rests, finally, on linguistic no less than on such comparative evidence as has already been indicated. In turn, this leads to consideration of the larger and at present more pertinent evidence that these dwellers in the round towns were in part ancestors of the Zuñis, and that thus, as assumed at the outset, the Zuñis are of composite, at least dual, origin, and that their last, still existing, phase of culture is of dual derivation.

The archaic and sacred name for the south in Zuñi is *Álahoïnkwin táhna*, but the name more commonly employed—always in familiar or descriptive discourse—is *Mák'yaiakwin táhna* (that is, the "direction of the salt-containing water or lake," from *ma*, salt; *k'yaía*, water, or lake-containing or bearing; *kwin*, place of, and *táhna*, point or direction of). That this name should have displaced the older form in familiar usage is significant of the great importance attached to their source of salt by the early Zuñis; yet but natural, for the older form, *Álahoïnkwin táhna*, signifies "in the direction of the home (or source) of the coral shells," from *álaho*, glowing red shell-stuff; *ïnkwïn*, abiding place of, or containing place of, and *táhna*. This source of the *álahowe* or coral red shells (which are derived from several species of subtropical mollusks, and were so highly prized by the southwestern tribes that the Indians of the lower Colorado traded in them as assiduously as did those of the cliffs and round towns in salt) has been for generations the Gulf of California and the lower coast to beyond Guaymas.

It is not improbable, then, that this archaic and now exclusively ritualistic expression for the southward or the south is a surviving paraphrase of the name for south (or of the source in the south of the red shells), formerly known to the western branch of the Zuñi ancestry, and once familiarly used by them to designate also, perhaps, the direction of the source of their chief treasure (these coral red shells of aboriginal commerce), as in the Gulf of California, which was then south of them, but is now due west-southwestward from them.

What renders this supposition still more probable, and also strengthens the theory of the dual origin of many parallelisms in Zuñi culture, observances, and phraseology, is not so much the fact that this name for red shells and the archaic Zuñi name for red paint, *áhona*, resemble in sound and meaning the Yuman *ahowata*, *ahauti*, etc., for red paint, nor yet the fact that such resemblance extends to many archaic and other terms, for example of relationship in the Zuñi as compared

[1] A parallel world example of the influence of salt sources on the movements of primitive peoples may be found in the fact that all the great historic trade routes across Asia were first established along salt trails of prehistoric times.

especially with corresponding terms in the Yavapai Tulkepaiya and other dialects of the Yuman. In fact, all the terms in Zuñi for the four quarters are twofold and different, according as used familiarly or ritualistically. That for west, for instance, is in the archaic and ritualistic form, *K'yálishïnkwïn táhna*, and signifies "direction of the home, or source of mists and waters, or the sea;" which, when the Zuñi abode in the farther southwest near the Pacific, was the appropriate name for west. But the familiar name for west in modern Zuñi is *Súnhakwïn táhna*, the "direction of the place of evening," which is today equally appropriate for their plateau-encircled home of the far inland.

"North," in the archaic form, is now nearly lost; yet in some of the more mystic rituals it occurs as both *Wímaiyawan táhna* (*Wíkutaiya* is "north" in the Yuma), "direction of the oak mountains," and *Yä'lawaunankwin táhna*, literally "direction of the place of the mountain ranges," which from the lower Colorado and southern Arizona are toward the north, but from northern Zuñi are not so conspicuous as in the other direction, as, for instance, toward the southwest. On the other hand, if we consider the familiar phrase for north, *Pïsh'lankwïn táhna*, "direction of the wind-swept plains," or of the "plains of the mightiest winds," to have been inherited from the aboriginal round-town Zuñis, then it was natural enough for them to have named the north as they did; for to the north of their earlier homes in the cliffs and beyond lay the measureless plains where roamed the strong Bison God of Winds, whence came his fierce northern breath and bellowings in the roar of storms in winter.

The east, in common language, signifies "direction of the coming of day;" but in the ritual speech signifies "direction of the plains of daylight"—a literal description of the great Yuma desert as seen at daybreak from the Colorado region, but scarcely applicable to the country eastward from Zuñi, which is rugged and broken until the Llanos Estacados of Texas are reached.

The diverse meaning of terms in Zuñi architecture is no less significant of the diverse conditions and opposite directions of derivation of the Zuñi ancestry. If the aboriginal branch of the Zuñi were derived from the dwellers in the northern cliff towns, as has been assumed, then we would expect to find surviving in the names of such structural features of their pueblos as resulted from life in the cliffs linguistic evidence, as in the structures themselves material evidence, of the fact. Of this, as will presently be shown, there is an abundance.

If the intrusive branch of the Zuñi ancestry were, as has also been assumed, of extreme southwestern origin, then we should expect to find linguistic evidence of a similar nature, say, as to the structural modifications of the cliff-dweller and round-town architecture which their arrival at and ultimate position in these towns might lead us to expect to find, and which in fact is to be abundantly traced in later Zuñi ruins, like those of the historic Seven Cities of Cibola.

The conditions of life and peculiarities of building, etc., in the caves and cliffs, then in the round towns, have been commented on at some length in previous pages, and sufficiently described to render intelligible a presentation of this linguistic and additional evidence in regard to derivation from that direction; but it remains for me to sketch, as well as I can in brief, the more significant of such characteristics of the primitive Yuman house and village life as seem to bear on the additional linguistic and other evidence of derivation also from the opposite or Rio Colorado direction, for both clews should be presented side by side, if only for the sake of contrast.

These ancient people of the Colorado region, Yuman or other, had, as their remains show (not in their earliest period, nor yet in a later stage of their development, when a diverging branch of them—"Our lost others"[1]—had attained to a high state of culture in southern Arizona and northern Mexico, but at the time of their migration in part Zuñiward), houses of quite a different type from those of the north. They were mainly rancherias, that is, more or less scattered over the mesas and plains. They were but rarely round, commonly parallelogrammic, and either single or connected in straight L-shape or double L-shape rows. The foundations were of rough stones, designed probably to hold more firmly in place the cane-wattled, mud-plastered stockades which formed the sides and ends as well as (in the house rows) the partitions. They owed their rectangular shapes not to crowding, but to development from an original log-built house type—in the open (like the rancheria house type of the Tarahumári), to which may also be traced their generally greater length than width. They were single storied, with rather flat or slightly sloping roofs, although the high pitched roof of thatch was not wholly unknown, for it was still employed on elevated granaries; but sometimes (this was especially the case with single houses) the stockade posts were carried up above this roof on three sides, and overlaid with saplings on which, in turn, a bower of brush or cane or grass was constructed to protect from the sun rather than from rain. Thus a sort of rude and partial second story was formed, which was reached from below by means of a notched step-log made of a forked or branching tree-trunk, the forks being placed against the edge of the roof proper to keep the log (the butt of which rested on the ground) from turning when being ascended.[2]

Of these single houses the "bowers" described in the following myth of the creation of corn (see page 391), and typically surviving still to a great extent in the cornfield or farm huts of modern Zuñi, may be taken as fair examples; and of the villages or hut-row structures of these ancient plains and valley people, an excellent example may

[1] See pages 403, 405–406.

[2] See Mindeleff, Architecture of Tusayan and Cibola, Eighth Ann. Rep. Bur. Ethnology, p. 157.

be found in the long-houses of the Mohave and other Yumans of the valley of Colorado river. Both these hut-row houses and the single-room houses were generally surrounded by low walls of loose stone, stone and mud, stockade and mud, or of mud alone; and as often as not one side or the front of a hut within such a wall inclosure was left entirely open.

Thus the outer wall was intended in part as a slight protection from the wind, and probably also to guard from flooding during the sudden showers which sometimes descend in torrents over Arizona plains. They may also have been designed to some extent for protection from the enemy; for these people were far more valiant fighters than their ultimate brethren of the north, and depended for protection less on security of position than on their own prowess. Only during times of unusual danger did they retire to fortified lava buttes (or, when near them, to deep but more or less open crevices in some of the more extensive lava fields), where their hut foundations may be found huddled together within huge inclosures of natural lava blocks, dry laid and irregular, but some of them skillfully planned and astonishingly vast; but in these strongholds they never tarried long enough to be influenced in their building habits sufficiently to change the styles of their hamlets in the plains, for until we reach the point in eastern Arizona where they joined the "elder nations" no change in ground plan of these houses is to be traced in their remains.

It is necessary to add a few details as to costume, usages, and the institutions of these semisettled yet ever shifting people.

They wore but scant clothing besides their robes and blankets—breech-clouts and kilts, short for the men, long for the women, and made of shredded bark and rushes or fiber; sandals, also of fiber; necklaces of shell beads, and pendent carved shell gorgets. The hair was bobbed to the level of the eyebrows in front, but left long and hanging at the back, gathered into a bunch or switch with a colored cord by the men, into which cord, or into a fillet of plaited fiber, gorgeous long tail feathers of the macaw, roadrunner, or eagle were thrust and worn upright. To the crown of the head of the warriors was fastened a huge bunch of stripped or slitted feathers of the owl or eagle, called, no doubt, then as now by its Yuman name, *musema;* for it is still known, though used in different fashion, as the *múmtsemak'ya* or *múmpalok'ye* by the Zuñi Priests of the Bow. The warriors also carried targets or shields of yucca or cotton cord, closely netted across a strong, round hoop-frame and covered with a coarser and larger net, which was only a modification of the carrying net (like those still in use by the Papago, Pima, and other Indians of southern Arizona), and was turned to account as such, indeed, on hunting and war expeditions.

Their hand weapons were huge stone knives and war clubs shaped like potato-mashers, which were called, it would seem, *iitekati* (their

Yuman name) for, although changed in the Zuñi of today, still strikingly survives in familiar speech as the expression *ítehk'ya* or *ítehk'yäti*, to knock down finally or fatally, and in ceremonial allusion (rather than name) to the old-fashioned and sacred war clubs (which are of identical form) as *ítehk'yatáwe*, or knocking-down billets, otherwise called face-smashers or pulpers.

They sometimes buried the dead—chiefly their medicine men and women, or shamans; but all others were burned (with them personal effects and gifts of kin) and their ashes deposited in pots, etc., at the heads of arroyas, or thrown into streams. They held as fetiches of regenerative as well as protective power certain concretionary stones, some of the larger of which were family heirlooms and kept as household gods, others as tribal relics and amulets, like the canopas and huacas of ancient Peru. These nodules were so knobbed, corrugated, and contorted that they were described when seen elsewhere by the early Spanish writers as bezoars, but they were really derived from the sources of arroyas, or mountain torrents, in the beds of which they are sometimes found, and being thus always water-worn were regarded as the seed of the waters, the source of life itself. Hence they were ceremoniously worshiped and associated with all or nearly all the native dances or dramaturgies, of which dances they were doubtless called by their old time possessors "the ancients," or "stone ancients," a name and in some measure a connection still surviving and extended to other meanings with reference to similar fetich stones among the Zuñis of today.

From a study of the remains of these primitive Arizonian ancestors of the Zuñis in the light of present-day Zuñi archaisms, and especially of the creation myths themselves, it would be possible to present a much fuller sketch of them. But that which has already been outlined is sufficiently full, I trust, to prove evidential that the following Zuñi expressions and characteristics were as often derived from this southwestern branch as from the cliff dweller or aboriginal branch of the Zuñi ancestry:

The Zuñi name of an outer village wall is *hék'yapane*, which signifies, it would seem, "cliff-face wall;" for it is derived, apparently, from *héäne*, an extended wall; and *ák'yapane*, the face of a wide cliff. Thus it is probably developed from the name which at first was descriptive of the encircling rear wall of a cave village, afterward naturally continued to be applied to the rear but encircling or outside wall of a round town, and hence now designates even a straight outer wall of a village, whether of the front or the rear of the houses.

The name for the outer wall of a house, however, is *héine*, or *héline*, which signifies a mud or adobe inclosure; from *héliwe*, mud (or mud-and-ash) mortar, and *úline*, an inclosure. Since in usage this refers to the outer wall of a house or other simple structure, but not to that of a town or assemblage of houses, its origin may with equal propriety

be attributed to the mud-plastered corral or adobe sides or inclosures of such rancherias as I have already described.[1]

Again, the names in Zuñi, first, for a room of a single-story structure, and, second, for an inner room on the ground floor of such or of a terraced structure, are (1) *télitona*, "room or space equally inclosed," that is, by four equal or nearly equal walls; and (2) *téluline*, "room or space within (other rooms or) an inclosure. Both of these terms, although descriptive, may, from their specific use, be attributed to single-story rancheria origin, I think, for in the cliff villages there was no ground-floor room. The name for a lowermost room in the cliff villages still seemingly survives in the Zuñi name for a cellar, which is *ápaline*, from *a*, rock, and *páloiye*, buried in or excavated within; while the cliff name for an upper room or top-story room, *óshtenu-'hlane*, from *óshten*, a cave-shelter or cave roof, and *ú'hlane*, inclosed by, or built within the hollow or embrace of, also still survives. Yet

[1] In my "Study of Pueblo Pottery," etc. (Fourth Annual Report of the Bureau of Ethnology, 1882–83), I have said that "The archaic name for a building or walled structure is *héshota*, a contraction of the now obsolete term *héshotapone;* from *hésho*, gum, or resin-like; *shótaie*, leaned or placed together convergingly; *tápoane*, a roof (covering) of wood, or a roof (covering) supported by wood."

I regret to say that the etymology of this word as thus rendered was not quite correct, and therefore its meaning as interpreted in the passage which immediately followed was also mistaken. It is quite true that *hésho* signifies gum or resin, etc. (referring, as I then supposed, to *áhesho*, or gum rock, a name for lava; used constructively in the oldest round huts of the basaltic regions); but the root *he* enters into many other compounds, such as not only wax, gum, pitch, metal (as being rock-pitch, that is, melted from rocks), etc., but also mud, clay-paste, mud-mortar, and finally adobe, as being dried mud mortar; hence walls made either with or of adobe, etc. Had I been, at the time of this first writing, as familiar with the language as I now am I should not have connected as a single root *he* and *sho*, making *hésho* (gum or pitch) of it. For, as elsewhere stated in the same essay, *shówe* signifies canes, (*shóole*, a cane or reed), and it now appears that the syllable thus derived formed a root by itself. But I had not then learned that the greater number of the ruins of southern Arizona, especially of the plains, consisted of gabion-like walls, that is, of walls made by packing stiff earth or rubble mortar or cement between double or parallel cane-wattled stockades, and then heavily plastering this exterior or casing (as was the case in the main walls of the celebrated Casa Grande and the temple mound of Los Muertos); or else, in less massive ruins of lesser walls the cores or supports of which consisted of close-set posts lathed with reeds or canes, the mud or cement being built up either side of these cores, or, in case of the thinnest walls, such as partitions, merely plastered to either face.

I can not doubt that even the grandest and most highly developed of these ruins—the Casas Grandes themselves, which look today as if constructed wholly of massive masonry—no less than the simplest plastered stockade walls, were developed from such beginnings as the mere mud-plastered cane and stockade screens of the ancient rancheria builders. Thus, I am constrained to render the primary meaning of *héshotapoane* as approximately "mud-plastered cane and stick structure;" from *heliwe*, mud mortar; *shówe*, canes or reeds; *táwe*, wood, or *tátawe*, wood-posts; *póa*, to place (leaningly or closely) over against; and *ne*, (any) thing made. From this, the generic term *héshota*, for walled structure (especially ruined wall-structures), would very naturally have been derived, and this might or might not have given rise to the use of the prefix *he*, as occurring in all names for *mortar-laid* walls.

other examples of diversely derived house-names in this composite phraseology might be added, but one more must suffice. The Zuñi name for a ladder is *'hlétsilone*, apparently from *'hléwe*, slats (*'hléma*, slat), and *tsilulona*, hair, fiber, or osier, entwined or twisted in. This primary meaning of the name would indicate that before the ladder of poles and slats was used, rope ladders were commonly in vogue, and if so, would point unmistakably to the cliffs as the place of its origin; for many of the cliff dwellings can not now be reached save by means of ropes or rope ladders. Yet, although the name for a stairway (or steps even of stone or adobe) might naturally, one would suppose, have been derived from that of a ladder (if ladders were used before stairs, or vice versa if the reverse was the case), nevertheless it has a totally independent etymology, for it is *íyechiwe*, from *íkŏiyächi*, forked log or crotch-log, and *yéhchiwe*, walking or footing-notched; that is, notched step-log or crotch. And this it would seem points as unmistakably to such use of forked and notched step logs or crotch-logs as I have attributed to the rancheria builders, as does the "rope-and-slat" ladder-name to the use of the very different climbing device I have attributed to the cliff dwellers.

It is probable that when the round-town builders had peopled the trail of salt as far from the northward as to the region of Zuñi and beyond, the absence of very deep canyons, containing rock-sheltered nooks sufficiently large and numerous to enable them to find adequate accommodation for cliff villages, gradually led them to abandon all resort to the cliffs for protection—made them at last no longer cliff dwellers, even temporarily, but true Pueblos, or town dwellers of the valleys and plains.

But other influences than those of merely natural or physical environment were required to change their mode of building, and correspondingly, to some extent, their institutions and modes of life from those of round-town builders to those of square-town builders, such as in greater part they were at the time of the Spanish discoveries. In the myths themselves may be found a clew as to what these influences were in that which is told of the coming together of the "People of the Midmost" and these "Dwellers-in-the-towns-builded-round." For there is evidence in abundance also of other kind, and not a little of it of striking force and interest, that this coming together was itself the chief cause of the changes referred to. It has been seen that the western branch of the Zuñi ancestry (who were these "People of the Midmost") were almost from the beginning dwellers in square structures; that their village clusters, even when several of their dwelling places happened to be built together, were, as shown by their remains wherever found, built precisely on the plans of single-house structures—that is, they were simple extensions, mostly rectilinear, of these single houses themselves.

Now peoples like those of the round towns, no less than primitive peoples generally, conceive of everything made, whether structure,

utensil, or weapon, as animistic, as living. They conceive of this life of things as they do of the lives of plants, of hibernating animals, or of sleeping men, as a still sort of life generally, but as potent and aware, nevertheless, and as capable of functioning, not only obdurately and resistingly but also actively and powerfully in occult ways, either for good or for evil. As every living thing they observe, every animal, has form, and acts or functions according to its form—the feathered and winged bird flying, because of its feathered form; the furry and four-footed animal running and leaping, because of its four-footed form, and the scaly and finny fish swimming, because also of its fins and scales and form appropriate thereto—so these things made or born into special forms of the hands of man also have life and function variously, according to their various forms.

As this idea of animals, and of things as in other sort animals, is carried out to the minutest particular, so that even the differences in the claws of beasts, for example, are supposed to make the difference between their powers of foot (as between the hugging of the bear and the clutching of the panther), it follows that form in all its details is considered of the utmost importance to special kinds of articles made and used, even of structures of any much used or permanent type. Another phase of this curious but perfectly natural attributive of life and form-personality to material things, is the belief that the forms of these things not only give them power, but also restrict their power, so that if properly made, that is, made and shaped strictly as other things of their kind have been made and shaped, they will perform only such safe uses as their prototypes have been found to serve in performing before them. As the fish, with scales and fins only, can not fly as the duck does, and as the duck can not swim under the water except so far as his feathers, somewhat resembling scales, and his scaly, webbed feet, somewhat resembling fins enable him to do so, thus also is it with things. In this way may be explained better than in any other way, I think, the excessive persistency of form-survival, including the survival of details in conventional ornamentation in the art products of primitive peoples—the repetitions, for instance, in pottery, of the forms and even the ornaments of the vessels, basketry, or what not, which preceded it in development and use and on which it was first modeled. This tendency to persist in the making of well-tried forms, whether of utensil or domicile, is so great that some other than the reason usually assigned, namely, that of mere accustomedness, is necessary to account for it, and the reason I have given is fully warranted by what I know of the mood in which the Zuñis still regard the things they make and use, and which is so clearly manifest in their names of such things. It is a tendency so great, indeed, that neither change of environment and other conditions, nor yet substitution of unused materials for those in customary use for the making of things, will effect change in their forms at once, even though in preserving older forms in this newer sort of mate-

rial the greatest amount of inconvenience be encountered. There is, indeed, but one influence potent enough to effect change from one established form to another, and that is acculturation; and even this works but slowly and only after long and familiar intercourse or after actual commingling of one people with a diversely developed people has taught them the safety and efficiency of unfamiliar forms in uses familiarly associated with their own accustomed but different forms. Sooner or later such acculturation invariably effects radical change in the forms of things used by one or the other of the peoples thus commingling, or by both; though in the latter case the change is usually unequal. In the case here under consideration there is to be found throughout the nearer Zuñi country ruins of the actual transitional type of pueblo thus formed by the union of the two ancestral branches of the Zuñis, the round town with its cliff-like outer wall merging into the square, terraced town with its broken and angular or straight outer walls; and in these composite towns earliest appears, too, the house wall built into (not merely against) the outer walls of the curved portions no less than into the outer walls of the squared or straight portions.

The composite round and square pueblo ruin is not, however, confined to this transitional type or to its comparatively restricted area wherever occurring, but is found here and there as far northward, for instance, as the neighborhood of older cliff ruins. But in such cases it seems to have been developed, as heretofore hinted, in the comparatively recent rebuilding of old rounded towns by square-house builders. Quite in correspondence with all this is the history of the development, from the round form into the square, of the kivas of the later Zuñi towns; that is, like the towns themselves, the round kivas of the earlier round towns became, first in part and then nearly squared in the composite round and square towns, and finally altogether squared in the square towns. This was brought about by a twofold cause. When the cliff dwellers became inhabitants of the plains, not only their towns, but also the kivas were enlarged. To such an extent, indeed, were the latter enlarged that it became difficult to roof them over in the old fashion of completing the upper courses of the walls with cross-laid logs, and of roofing the narrowed apex of this coping with combined rafter and stick structures; hence in many cases, although the round kiva was rigidly adhered to, it was not unfrequently inclosed within a square wall in order that, as had come to be the case in the ordinary living rooms, rafters parallel to one another and of equal length might be thrown across the top, thus making a flat roof essentially like the flat terrace roofs of the ordinary house structure.

It is not improbable that the first suggestion of inclosing the round kiva in a square-walled structure and of covering the latter with a flat roof arose quite naturally long before the cliff dwellers descended into the plains. It has been seen that frequently, in the larger and longest occupied cliff-towns, the straight-walled houses grew outward wholly

around the kivas; and when this occurred the round kiva was thus not only surrounded by a square inclosure—formed by the walls of the nearest houses,—but also it became necessary to cover this inclosing space with a flat roof, in order to render continuous the house terrace in which it was constructed. Still, the practice never became general or intentional in the earlier cliff-towns; probably, indeed, it became so in the now ruined round towns only by slow degrees. Yet it needed after this (in a measure) makeshift beginning only such influence of continued intercourse between the square-house building people and these round-town building people to lead finally to the practical abandonment by the latter of the inner round structure surviving from their old-fashioned kivas, and to make them, like the modern Zuñi kiva, square rather than round.

An evidence that this was virtually the history of the change from the round kiva building to the square kiva building, and that this change was wrought thus gradually as though by long-continued intercourse, is found in the fact that to this day all the ceremonials performed in the great square kivas of Zuñi would be more appropriate in round structures. For example, processions of the performers in the midwinter night ceremonials in these kivas, on descending the ladders, proceed to their places around the sides of the kivas in circles, as though following a circular wall. The ceremonials of concerted invocation in the cult societies when they meet in these kivas are also performed in circles, and the singers for dances or other dramaturgic performances, although arranged in one end or in the corner of the kiva, continue to form themselves in perfect circles; the drum in the middle, the singers sitting around and facing it as though gathered within a smaller circular room inclosed in the square room. Thus it may be inferred, first, from the fact that in the structural details of the scuttles or hatchways by which these modern kivas are entered the cross-logged structure of the inner roof of the earliest cliff kivas survive, and from the additional fact above stated that the ceremonials of these kivas are circular in form, that the square kiva is a lineal descendant of the round one; and second, that even after the round kiva was inclosed in the square room, so to say, in order that its roof might be made as were the roofs of the women's houses, or continuous therewith, it long retained the round kiva within, and hence the ceremonials necessarily performed circularly within this round inner structure became so associated with the outer structure as well, that after the abandonment entirely, through the influences I have above suggested, of these round inner structures, they continued thus to be performed.

As further evidence of the continuity of this development from the earliest to the latest forms, certain painted marks on the walls of the cliff kivas tell not only of their derivation in turn from a yet earlier form, but also and again of the derivation from them of the latest forms. In the ancient ruins of the scattered round houses, which, it is pre-

sumed, mark the sites of buildings belonging to the earlier cliff ancestry folk on the northern desert borders, there are discovered the remains of certain unusually large huts, the walls of which appear to have been strengthened at four equidistant points by firmly planted upright logs. It is probable that, alike in this distribution and in the number of these logs, they corresponded almost strictly to the poles of, first, the medicine tent, and, second, the medicine earth lodge. When, in a later period of their development, these builders of the round huts in the north came to be, as has heretofore been described, dwellers in the kivas of the caves, their larger, presumably ceremonial structures, while reared without the strengthening posts referred to, nevertheless contained, as appropriate parts, the marks of them on the walls corresponding thereto. At any rate, in the still later kivas of the cliffs three parallel marks, extending from the tops of the walls to the floors, are found painted on the four sides of the kivas. Finally, in the modern square kiva of Zuñi there are still placed, ceremonially, once every fourth year, on the four sides of the lintels or hatchways, three parallel marks, and these marks are called by the Zuñi in their rituals the holders-up of the doorways and roofs. Many additional points in connection not only with the structural details of, but also in the ceremonials performed within, these modern kivas, may be found, survivals all pointing, as do those above mentioned, to the unbroken development of the kiva, from the earth medicine lodge to the finished square structure of the modern Zuñi and Tusayan Indians.

It likewise has been seen that through very natural causes a strict division between the dwellings of the women and children and of the adult male population of the cliff villages grew up. From the relatively great numbers of the kivas found in the courts of the round towns, it may be inferred that this division was still kept up after the cliff dwellers became inhabitants of the plains and builders of such round towns; for when first the Spaniards encountered the Zuñi dwellers in the Seven Cities of Cibola they found that, at least ceremonially, this division of the men's quarters from those of the women was still persisted in, but there is evidence that even thus early it was not so strictly held to on other occasions. Then, as now, the men became permanent guests, at least, in the houses of their wives, and it is probable that the cause which broke down this previous strict division of the sexes was the union of the western or rancheria building branch of the Zuñi ancestry with the cliff and round-town building branch.

In nothing is the dual origin of the Zuñis so strongly suggested as in the twofold nature of their burial customs at the time when first they were encountered by the Spaniards; for according to some of the early writers they cremated the dead with all of their belongings, yet according to others they buried them in the courts, houses, or near the walls of their villages. It has already been stated that the cliff dwellers buried their dead in the houses and to the rear of their cavern villages,

and that, following them in this, the dwellers in the round towns buried their dead also in the houses and to the rear—that is, just outside of their villages. It remains to be stated that nearly all of the Yuman tribes, and some even of the Piman tribes, of the lower Colorado region disposed of their dead chiefly by cremation. Investigation of the square house remains which lie scattered over the southwestern and central portions of Arizona would seem to indicate that the western branch of the Zuñi ancestry continued this practice of cremating the greater number of their dead. If this be true, the custom on the one hand of cremating the dead, which was observed by Castañeda at Mátsaki, one of the principal of the Seven Cities of Cibola, and the practice of burying the dead observed by others of the earliest Spanish explorers, are easily accounted for as being survivals of the differing customs of the two peoples composing the Zuñi tribe at that time. As has been mentioned in the first part of this introductory, both of these very different customs continued ceremonially to be performed, even after disposal of the dead solely by burial under the influence of the Franciscan fathers came to be an established custom.

In the Kâ'kâ, or the mythic drama dance organization of the Zuñis, there is equal evidence of dual origin, for while in the main the *kâ'kâ* of the Zuñis corresponds to the *katzina* of the Rio Grande Pueblo tribes and to the *kachina* of the Tusayan Indians, yet it possesses certain distinct and apparently extraneous features. The most notable of these is found in that curious organization of priest-clowns, the Kâ'yimäshi, the myth of the origin of which is so fully given in the following outlines (see page 401). It will be seen that in this myth these Kâ'yimäshi are described as having heads covered with welts or knobs, that they are referred to not only as "husbands of the sacred dance" or the "*kâ'kâ*" (from *kâ'kâ* and *yémäshi*, as in *óyemäshi*, husband or married to) and as the Old Ones or *Á'hläshiwe*.

Throughout the Rio Colorado region, and associated with all the remaining ruins of the rancheria builders in central and even eastern Arizona as well, are found certain concretions or other nodular and usually very rough stones, which today, among some of the Yuman tribes, are used as fetiches connected both with water worship and household worship. Among the sacred objects said to have been brought by the Zuñi ancestry from the places of creation are a number of such fetich-stones, and in all the ruins of the later Zuñi towns such fetich-stones are also found, especially before rude altars in the plazas and around ancient, lonely shrines on the mesas and in the mountains. These fetich-stones are today referred to as *á'hläshiwe*, or stone ancients, from *a*, a stone, *'hlä'shi*, aged one, and *we*, a plural suffix. The resemblance of this name to the *Á'hläshiwe* as a name of the Kâ'yemäshi strongly suggests that the nodular shape and knobbed mask-heads of these priest-clowns are but dramatic personifications of these "stone ancients," and if one examine such stones, especially when used

in connection with the worship and invocation of torrents, freshets, and swift-running streams (when, like the masks in question, they are covered with clay), the resemblance between the fetich-stones and the masks is so striking that one is inclined to believe that both the characters and their names were derived from this single source. From the fact that this peculiar institution of the clown-priest organization, associated with or, as the Zuñis say, literally married to the Cachina, or Kâ′kâ proper, was at one time peculiarly Zuñi, as is averred by themselves and avowed by all the other Pueblos, it would seem that it was distinctively an institution of the western branch of their ancestry, since also, as the myths declare, these Old Ones were born on the sacred mountains of the Kâ′kâ, on the banks of the Colorado Chiquito in Arizona. Finally, this is typical of many, if not all, features which distinguish the Zuñi Kâ′kâ from the corresponding organizations of other Pueblo tribes.

OUTLINE OF ZUÑI MYTHO-SOCIOLOGIC ORGANIZATION.

A complete outline of the mytho-sociologic organization of the Zuñi tribe can not in this connection be undertaken. A sufficient characterization of this probably not unique combination of the sociologic and mythologic institutions of a tribe should, however, be given to make plain certain allusions in the following outlines which it is feared would otherwise be incomprehensible.

The Zuñi of today number scarcely 1,700 and, as is well known, they inhabit only a single large pueblo—single in more senses than one, for it is not a village of separate houses, but a village of six or seven separate parts in which the houses are mere apartments or divisions, so to say. This pueblo, however, is divided, not always clearly to the eye, but very clearly in the estimation of the people themselves, into seven parts, corresponding, not perhaps in arrangement topographically, but in sequence, to their subdivisions of the "worlds" or world-quarters of this world. Thus, one division of the town is supposed to be related to the north and to be centered in its kiva or estufa, which may or may not be, however, in its center; another division represents the west, another the south, another the east, yet another the upper world and another the lower world, while a final division represents the middle or mother and synthetic combination of them all in this world.

By reference to the early Spanish history of the pueblo it may be seen that when discovered, the Áshiwi or Zuñis were living in seven quite widely separated towns, the celebrated Seven Cities of Cibola, and that this theoretic subdivision of the only one of these towns now remaining is in some measure a survival of the original subdivision of the tribe into seven subtribes inhabiting as many separate towns. It is evident that in both cases, however, the arrangement was, and is, if we may call it such, a mythic organization; hence my use of the term the mytho-sociologic organization of the tribe. At any rate, this is

the key to their sociology as well as to their mythic conceptions of space and the universe. In common with all other Indian tribes of North America thus far studied, the Zuñis are divided into clans, or artificial kinship groups, with inheritance in the female line. Of these clans there are, or until recently there were, nineteen, and these in turn, with the exception of one, are grouped in threes to correspond to the mythic subdivision I have above alluded to. These clans are also, as are those of all other Indians, totemic; that is, they bear the names and are supposed to have intimate relationship with various animals, plants, and objects or elements. Named by their totems they are as follows:

Kâ'lokta-kwe, Crane or Pelican people; Póyi-kwe (nearly extinct), Grouse or Sagecock people; Tá'hluptsi-kwe (nearly extinct), Yellow-wood or Evergreen-oak people; Aiñ'shi-kwe, Bear people; Súski-kwe, Coyote people; Aíyaho-kwe, Red-top plant or Spring-herb people; Ána-kwe, Tobacco people; Tâ'a-kwe, Maize-plant people; Tónashi-kwe, Badger people; Shóhoita-kwe, Deer people; Máawi-kwe (extinct), Antelope people; Tóna-kwe, Turkey people; Yä'tok'ya-kwe, Sun people; Ápoya-kwe (extinct), Sky people; K'yä'k'yäli-kwe, Eagle people; Ták'ya-kwe, Toad or Frog people; K'yána-kwe (extinct), Water people; Chítola-kwe (nearly extinct), Rattlesnake people; Píchi-kwe, Parrot-Macaw people.

Of these clans the first group of three appertains to the north, the second to the west, the third to the south, the fourth to the east, the fifth to the upper or zenith, and the sixth to the lower or nadir region; while the single clan of the Macaw is characterized as "midmost," or of the middle, and also as the all-containing or mother clan of the entire tribe, for in it the seed of the priesthood of the houses is supposed to be preserved. The Zuñi explanation of this very remarkable, yet when understood and comprehended, very simple and natural grouping of the clans or totems is exceedingly interesting, and also significant whether it throw light on the origin, or at least native meaning, of totemic systems in general, as would at first seem to be the case, or whether, as is more probably the case in this instance, it indicates a native classification, so to say, or reclassification of clans which existed before the culture had been elaborated to its present point. Briefly, the clans of the north—that is, those of the Crane, the Grouse, and Evergreen-oak—are grouped together and are held to be related to the north because of their peculiar fitness for the region whence comes the cold and wherein the season of winter itself is supposed to be created, for the crane each autumn appears in the van of winter, the grouse does not flee from the approach of winter but puts on his coat of white and traverses the forests of the snow-clad mountains as freely as other birds traverse summer fields and woodlands, caring not for the cold, and the evergreen oak grows as green and is as sturdy in winter as other trees are in spring or summer; hence these are totems and in a sense god-beings of the north and of winter, and the clanspeople named after them and

considered as, mythically at least, their breath-children, are therefore grouped together and related to the north and winter as are their totems. And as the bear, whose coat is grizzly like the evening twilight or black like the darkness of night, and the gray coyote, who prowls amidst the sagebrush at evening and goes forth and cries in the night-time, and the spring herb or the red-top plant, which blooms earliest of all flowers in spring when first the moisture-laden winds from the west begin to blow—these and the people named after them are as appropriately grouped in the west. The badger, who digs his hole on the sunny sides of hills and in winter appears only when the sun shines warm above them, who excavates among the roots of the juniper and the cedar from which fire is kindled with the fire drill; the wild tobacco, which grows only where fires have burned, and the corn which anciently came from the south and is still supposed to get its birth from the southland, and its warmth—these are grouped in the south. The turkey, which wakes with the dawn and helps to awaken the dawn by his cries; the antelope and the deer, who traverse far mesas and valleys in the twilight of the dawn—these and their children are therefore grouped in the east. And it is not difficult to understand why the sun, the sky (or turkis), and the eagle appertain to the upper world; nor why the toad, the water, and the rattlesnake appertain to the lower world.

By this arrangement of the world into great quarters, or rather as the Zuñis conceive it, into several worlds corresponding to the four quarters and the zenith and the nadir, and by this grouping of the towns, or later of the wards (so to call them) in the town, according to such mythical division of the world, and finally the grouping of the totems in turn within the divisions thus made, not only the ceremonial life of the people, but all their governmental arrangements as well, are completely systemized. Something akin to written statutes results from this and similar related arrangements, for each region is given its appropriate color and number, according to its relation to one of the regions I have named or to others of those regions. Thus the north is designated as yellow with the Zuñis, because the light at morning and evening in winter time is yellow, as also is the auroral light. The west is known as the blue world, not only because of the blue or gray twilight at evening, but also because westward from Zuñiland lies the blue Pacific. The south is designated as red, it being the region of summer and of fire, which is red; and for an obvious reason the east is designated white (like dawn light); while the upper region is many-colored, like the sunlight on the clouds, and the lower region black, like the caves and deep springs of the world. Finally, the midmost, so often mentioned in the following outline, is colored of all these colors, because, being representative of this (which is the central world and of which in turn Zuñi is the very middle or navel), it contains all the other quarters or regions, or is at least divisible into them. Again, each region—at least each of the four cardinal regions, namely,

north, west, south, and east—is the home or center of a special element, as well as of one of the four seasons each element produces. Thus the north is the place of wind, breath, or air, the west of water, the south of fire, and the east of earth or the seeds of earth; correspondingly, the north is of course the place of winter or its origin, the west of spring, the south of summer, and the east of autumn. This is all because from the north and in winter blow the fiercest, the greatest winds or breaths, as these people esteem them; from the west early in spring come the moistened breaths of the waters in early rains; from the south comes the greatest heat that with dryness is followed by summer, and from the east blow the winds that bring the frosts that in turn mature the seeds and perfect the year in autumn. By means of this arrangement no ceremonial is ever performed and no council ever held in which there is the least doubt as to the position which a member of a given clan shall occupy in it, for according to the season in which the ceremonial is held, or according to the reason for which a council is convened, one or another of the clan groups of one or another of the regions will take precedence for the time; the natural sequence being, however, first the north, second the west, third the south, fourth the east, fifth the upper, and sixth the lower; but first, as well as last, the middle. But this, to the Zuñi, normal sequence of the regions and clan groups, etc., has been determined by the apparent sequence of the phenomena of the seasons, and of their relations to one another; for the masterful, all conquering element, the first necessity of life itself, and to all activity, is the wind, the breath, and its cold, the latter overmastering, in winter all the other elements as well as all other existences save those especially adapted to it or potent in it, like those of the totems and gods and their children of the north. But in spring, when with the first appearance of the bear and the first supposed growls of his spirit masters in the thunders and winds of that time their breaths begin to bring water from the ocean world, then the strength of the winter is broken, and the snows thereby melted away, and the earth is revivified with drink, in order that with the warmth of summer from the south things may grow and be cherished toward their old age or maturity and perfection, and finally toward their death or sleeping in winter by the frost-laden breaths of autumn and the east.

Believing, as the Zuñis do, in this arrangement of the universe and this distribution of the elements and beings chiefly concerned in them, and finally in the relationship of their clans and the members thereof to these elementary beings, it is but natural that they should have societies or secret orders or cult institutions composed of the elders or leading members of each group of their clans as above classified. The seriation of these secret and occult medicine societies, or, better, perhaps, societies of magic, is one of the greatest consequence and interest. Yet it can but be touched upon here. In strict accordance with succession of the four seasons and their elements, and with their

supposed relationship to these, are classified the four fundamental activities of primitive life, namely, as relating to the north and its masterfulness and destructiveness in cold, is war and destruction; relating to the west is war cure and hunting; to the south, husbandry and medicine; to the east, magic and religion; while the above, the below, and the middle relate in one way or another to all these divisions. As a consequence the societies of cold or winter are found to be grouped, not rigidly, but at least theoretically, in the northern clans, and they are, respectively: 'Hléwe-kwe, Ice-wand people or band; Áchia-kwe, Knife people or band; Kâ'shi-kwe, Cactus people or band; for the west: Pí'hla-kwe, Priesthood of the Bow or Bow people or band (Ápi'hlan Shiwani, Priests of the Bow); Sániyak'ya-kwe, Priesthood of the Hunt or Coyote people or band; for the south: Máke'hlána-kwe, Great fire (ember) people or band; Máketsána-kwe, Little fire (ember) people or band; of the east: Shíwana-kwe, Priests of the Priesthood people or band; Ũhuhu-kwe, Cottonwood-down people or band; Shúme-kwe, or Kâ'kâ'hlána-kwe, Bird-monster people or band, otherwise known as the Great Dance-drama people or band; for the upper region: Néwe-kwe, Galaxy people or band or the All-consumer or Scavenger people or band (or life preservers); and for the lower regions: Chítola-kwe, Rattlesnake people or band, generators (or life makers). Finally, as produced from all the clans and as representative alike of all the clans and through a tribal septuarchy of all the regions and divisions in the midmost, and finally as representative of all the cult societies above mentioned is the Kâ'kâ or Ákâkâ-kwe or Mythic Dance drama people or organization. It may be seen of these mytho-sociologic organizations that they are a system within a system, and that it contains also systems within systems, all founded on this classification according to the six-fold division of things, and in turn the six-fold division of each of these divisions of things. To such an extent, indeed, is carried this tendency to classify according to the number of the six regions with its seventh synthesis of them all (the latter sometimes apparent, sometimes nonappearing) that not only are the subdivisions of the societies also again subdivided according to this arrangement, but each clan is subdivided both according to such a six-fold arrangement and according to the subsidiary relations of the six parts of its totem. The tribal division made up of the clans of the north takes precedence ceremonially, occupying the position of elder brother or the oldest ancestor, as the case might be. The west is the younger brother of this; and in turn, the south of the west, the east of the south, the upper of the east, the under of them all, while the middle division is supposed to be a representative being, the heart or navel of all the brothers of the regions first and last, as well as elder and younger. In each clan is to be found a set of names called the names of childhood. These names are more of titles than of cognomens. They are determined upon by sociologic and divinistic modes, and are

bestowed in childhood as the "verity names" or titles of the children to whom given. But this body of names relating to any one totem—for instance, to one of the beast totems—will not be the name of the totem beast itself, but will be names both of the totem in its various conditions and of various parts of the totem, or of its functions, or of its attributes, actual or mythical. Now these parts or functions, or attributes of the parts or functions, are subdivided also in a six-fold manner, so that the name relating to one member of the totem—for example, like the right arm or leg of the animal thereof—would correspond to the north, and would be the first in honor in a clan (not itself of the northern group); then the name relating to another member—say to the left leg or arm and its powers, etc.—would pertain to the west and would be second in honor; and another member—say the right foot—to the south and would be third in honor; and of another member—say the left foot—to the east and would be fourth in honor; to another—say the head—to the upper regions and would be fifth in honor; and another—say the tail—to the lower region and would be sixth in honor; while the heart or the navel and center of the being would be first as well as last in honor. The studies of Major Powell among the Maskoki and other tribes have made it very clear that kinship terms, so called, among other Indian tribes (and the rule will apply no less or perhaps even more strictly to the Zuñis) are rather devices for determining relative rank or authority as signified by relative age, as elder or younger of the person addressed or spoken of by the term of relationship. So that it is quite impossible for a Zuñi speaking to another to say simply brother; it is always necessary to say elder brother or younger brother, by which the speaker himself affirms his relative age or rank; also it is customary for one clansman to address another clansman by the same kinship name of brother-elder or brother-younger, uncle or nephew, etc.; but according as the clan of the one addressed ranks higher or lower than the clan of the one using the term of address, the word-symbol for elder or younger relationship must be used.

With such a system of arrangement as all this may be seen to be, with such a facile device for symbolizing the arrangement (not only according to number of the regions and their subdivisions in their relative succession and the succession of their elements and seasons, but also in colors attributed to them, etc.), and, finally, with such an arrangement of names correspondingly classified and of terms of relationship significant of rank rather than of consanguinal connection, mistake in the order of a ceremonial, a procession or a council is simply impossible, and the people employing such devices may be said to have written and to be writing their statutes and laws in all their daily relationships and utterances. Finally, with much to add, I must be content with simply stating that the high degree of systemization which has been attained by the Zuñis in thus grouping their clans severally and serially about a midmost group, we may see the influence of the coming together of

two diverse peoples acting upon each other favorably to the development of both in the application of such conceptions to the conduct of tribal affairs. It would seem that the conception of the midmost, or that group within all these groups which seems to be made up of parts of them all, is inherent in such a system of world division and tribal subdivision corresponding thereto; but it may also well be that this conception of the middle was made more prominent with the Zuñis than with any other of our southwestern peoples through the influence of the earthquakes, which obviously caused their ancestors from the west again and again to change their places of abode, thus emphasizing the notion of getting nearer to or upon the lap or navel of the earth mother, where all these terrific and destructive movements, it was thought, would naturally cease.

Be this as it may, this notion of the "middle" and its relation to the rest has become the central fact indeed of Zuñi organization. It has given rise to the septuarchy I have so often alluded to; to the office of the mortally immortal K'yäk'lu, keeper of the rituals of creation, from which so much sanction for these fathers of the people is drawn; to the consequent fixing in a series like a string of sacred epics, a sort of inchoate Bible, of these myths of creation and migration; and finally, through all this accumulated influence, it has served to give solidarity to the Zuñi tribe at the time of its division into separate tribes, making the outlying pueblos they inhabited subsidiary to the central one, and in the native acceptation of the matter, mere parts of it.

GENERAL EXPLANATIONS RELATIVE TO THE TEXT.

As the space originally apportioned to this merely preliminary essay on the Myths of Creation has already been greatly exceeded, the consideration even in outline of the cultural characteristics of the Zuñis, which would do much to further illumine the meaning of the myths, must be left to the second paper of the series. This will constitute a key or appendix to the present paper, and will contain such glossaries and detailed explanations as will render, it is hoped, all obscure passages clear, and will at the same time give my authority for framing and translating the myths as I have.

Chiefly, however, it will in turn introduce a third paper on the sacred dances or creation dramas of the Kâ'kâ, which originally the myths themselves (as the source of the songs, rituals, and forms of these dramas) were designed to introduce. Lastly, the whole series are but preliminary to a very extensive work on the subject which I contemplate producing so soon as health and opportunity for further researches among the Zuñis will permit.

As inclusive of the dramaturgies or dances, and nearly all other ceremonials of the Zuñis, this subject of their creation myths is almost inexhaustible. I, at least, can not hope to complete it, and I have

therefore chosen to treat it in its relation especially to their so-called dances, particularly to those of the Kâ′kâ.

With other primitive peoples as with the Zuñis, there seems to be no bent of their minds so strong or pervasive of and influential upon their lives as the dramaturgic tendency. That tendency to suppose that even the phenomena of nature can be controlled and made to act more or less by men, if symbolically they do first what they wish the elements to do, according to the ways in which, as taught by their mystic lore, they suppose these things were done or made to be done by the ancestral gods of creation time. And this may be seen in a searching analysis not only of the incidents and symbolisms in folk-tales as well as myths of such primitive peoples, but also in a study of the moods in which they do the ordinary things of life; as in believing that because a stone often struck wears away faster than when first struck it is therefore helpful in overcoming its obduracy to strike it—work it—by a preliminary dramatic and ritualistic striking, whereupon it will work as though already actually worked over, and will be less liable to breakage, etc.

All this and much more to the same effect will be illustrated in the papers which I have mentioned as designed to follow the present one.

There remain still a few points in this preliminary paper which must be commented upon—points regarding my own hand in the work chiefly. I use very freely such terms as "religious," "sacred," "priest," and "god," not because they always express exactly the native meaning, but for the reason that they do so more approximately than any other terms I could select. The fearful and mysterious, the magical and occult, all these and many other elements are usually included in the primitive man's religion, and hence terms like "sacred" must be given a less restricted value than they have in our speech or culture.

Again, while the Zuñi word *shíwani*, "priest," literally signifies guardian and possessor, as well as maker or keeper of the flesh, or seed of life of the Zuñis, it must not be supposed to represent a medicine-man, shaman, or sorcerer—for all of which there are specific differentiated terms in the Zuñi tongue. Those who bear that title are also divided into four classes, but among all these the functions of possessing a shrine, being ritualists, performing before the altars, and leading as well as ordering all organized sacerdotal ceremonials, is common. Therefore the simple term "priest," in the Pagan rather than in the Christian sense, is the best and truest that can be found.

Frequently I have occasion to reproduce portions of songs or rituals, or, again, words of the Uánami or "Beloved Gods." In the originals these are almost always in faultless blank verse meter, and are often even grandly poetic. I do not hesitate either to reproduce as nearly as possible their form, or to tax to the uttermost my power of expression in rendering the meanings of them where I quote, clear and effective and in intelligible English. Yet in doing this I do not have to depart very far from "scientific" accuracy, even in the linguistic sense.

Finally, I have entitled the originative division of this paper "Outlines of Zuñi Creation Myths," because, in the first place, this is but a preliminary rendering of these, and, properly speaking, they are a series of explanation-myths. Now, while such myths are generally disconnected, often, indeed, somewhat contradictory episode-legends with primitive peoples, they are, with the Zuñis, already become serial, and it is in their serial or epic form (but merely in outline) that I here give them. Although each is called a talk, and is held specifically by a particular organization or social division, yet all are called "the speech." This comes about in Zuñi by the presence in the tribal organization, as already explained, of a class of men and priests there called the "Midmost," or the "All," because hereditary in a single clan (the Macaw), yet representative sacerdotally of all the clans and all the priesthoods, which they out-rank as "Masters of the House of Houses."

With them all these various myths are held in brief and repeated in set form and one sequence as are placed the beads of a rosary or on a string, each entire, yet all making a connected strand. Here, then, we see the rudiment or embryo of a sacred epic such as that of the Kyä'klu or "Speaker of all times whensoever."

As finally published, this paper will contain the most ample explanation of all these points and many others, and will not ask, as it does today, catholic judgment and charitable interpretation.

The so-called dances of the Zuñis, and presumably those of all similar primitive peoples, are essentially religio-sociologic in character and always at least dramatic, or, more properly speaking, dramaturgic. It follows that to endeavor to describe and treat at all adequately of any one such ceremonial becomes a matter of exceeding difficulty, for it should involve a far more perfect scheme of the sociologic organization as well as at least a general survey of the mythology and religious institutions of the tribe to which it relates, such as I here present, as well as an absolutely searching description of all details in both the preparation for and the performance of such ceremonial.

For example, the celebrated Kâ'kâ or mythic drama-dance organization of the Zuñis, and for that matter all other of their ceremonials, are, any one of them, made up in personnel from specific clans. Thus formed, they are organized, and the actors and their parts divided in accordance with the groupings of these clans in relation to the symbolic regions of the world, or in this case literally septs. Finally, the paraphernalia and costumings, no less than the actions, songs, and rituals, are as distinctly founded on and related to the legend or legends dramatized.

At this point it seems desirable that the sense in which the terms "drama," "dramatic," and "dramaturgic" are employed in relation to these ceremonials be explained. This may best be done, perhaps, by contrasting the drama of primitive peoples, as I conceive it, with that of civilized peoples. While the latter is essentially spectacular, the

former has for its chief motive the absolute and faithful reproduction of creative episodes—one may almost say, indeed, the revivification of the ancient.

That this is attempted and is regarded as possible by primitive man is not to be wondered at when we consider his peculiar modes of conception. I have said of the Zuñis that theirs is a science of appearances and a philosophy of analogies. The primitive man, no less than the child, is the most comprehensive of observers, because his looking at and into things is not self-conscious, but instinctive and undirected, therefore comprehensive and searching. Unacquainted as he is with rational explanations of the things he sees, he is given, as has been the race throughout all time, to symbolic interpretation and mystic expression thereof, as even today are those who deal with the domain of the purely speculative. It follows that his organizations are symbolic; that his actions within these organizations are also symbolic. Consequently, as a child at play on the floor finds sticks all-sufficient for the personages of his play-drama, chairs for his houses, and lines of the floor for the rivers that none but his eyes can see, so does the primitive man regard the mute, but to him personified, appliances of his dance and the actions thereof, other than they seem to us.

I can perhaps make my meaning more clear by analyzing such a conception common to the Zuñi mind. The Zuñi has observed that the corn plant is jointed; that its leaves spring from these joints not regularly, but spirally; that stripped of the leaves the stalk is found to be indented, not regularly at opposite sides, but also spirally; that the matured plant is characterized, as no other plant is, by two sets of seeds, the ears of corn springing out from it two-thirds down and the tassels of seeds, sometimes earlets, at the top; also that these tassels resemble the seed-spikes of the spring-grass or pigeon-grass; that the leaves themselves while like broad blades of grass are fluted like plumes, and that amongst the ears of corn ever and anon are found bunches of soot; and, finally, that the colors of the corn are as the colors of the world—seven in number. Later on it may be seen to what extent he has legendized these characteristics, thus accounting for them, and to what extent, also, he has dramatized this, his natural philosophy of the corn and its origin. Nothing in this world or universe having occurred by accident—so it seems to the Zuñi mind,—but everything having been started by a personal agency or supernal, he immediately begins to see in these characteristics of the corn plant the traces of the actions of the peoples in his myths of the olden time. Lo! men lived on grass seeds at first, but, as related in the course of the legends which follow, there came a time when, by the potencies of the gods and the magic of his own priests or shamans, man modified the food of first men into the food of men's children. It needed only a youth and a maiden, continent and pure, to grasp at opposite sides and successively the blades of grass planted with plumes of supplication, and walking

or dancing around them, holding them firmly to draw them upward until they had rapidly grown to the tallness of themselves, then to embrace them together. Behold! the grasses were jointed where grasped four times or six according to their tallness; yea, and marked with the thumb-marks of those who grasped them; twisted by their grasp while circling around them and leaved with plume-like blades and tasseled with grass-like spikes at the tops. More wonderful than all, where their persons had touched the plants at their middles, behold! new seed of human origin and productive of continued life had sprung forth in semblance of their parentage and draped with the very pile of their generation. For lo! that when the world was new all things in it were *k'yaíuna*, or formative, as now is the child in the mother's womb or the clay by the thoughts of the potter. That the seed of seeds thus made be not lost it needed that Paíyatuma, the God of Dew and the Dawn, freshen these new-made plants with his breath; that Ténatsalï, the God of Time and the Seasons, mature them instantly with his touch and breath; that Kwélele, the God of Heat, ripen them with the touch of his Fire-brother's torch and confirm to them the warmth of a life of their own. Nevertheless, with the coming of each season, the creation is ever repeated, for the philosophy of ecclesiasticism is far older than ecclesiastics or their writings, and since man aided in the creation of the corn, so must he now ever aid in each new creation of the seed of seeds. Whence the drama of the origin of corn is not merely reenacted, but is revived and reproduced in all its many details with scrupulous fidelity each summer as the new seed is ripening. And now I may add intelligibly that the drama of primitive man is performed in an equally dramaturgic spirit, whether seen, as in its merely culminating or final enactment, or unseen and often secret, as in its long-continued preparations. In this a given piece of it may be likened to a piece of Oriental carving or of Japanese joinery, in which the parts not to be seen are as scrupulously finished as are the parts seen, the which is likewise characteristic of our theme, for it is due to the like dramaturgic spirit which dominates even the works, no less than the ceremonials, of all primitive and semiprimitive peoples.

So also it seems to the Zuñi that no less essential is it that all the long periods of creation up to the time when corn itself was created from the grasses must be reproduced, even though hastily and by mere signs, as are the forms through which a given species in animal life has been evolved, rapidly repeated in each embryo.

The significance of such studies as these of a little tribe like the Zuñis, and especially of such fuller studies as will, it is hoped, follow in due course, is not restricted to their bearing on the tribe itself. They bear on the history of man the world over. I have become convinced that they thus bear on human history, especially on that of human culture growth, very directly, too, for the Zuñis, say, with all their strange, apparently local customs and institutions and the lore thereof, are

representative in a more than merely general way of a phase of culture through which all desert peoples, in the Old World as well as in the New, must sometime have passed. Thus my researches among these Zuñis and my experimental researches upon myself, with my own hands, under strictly primitive conditions, have together given me insight and power to interpret their myths and old arts, as I could never otherwise have hoped to do; and it has also enlarged my understanding of the earliest conditions of man everywhere as nothing else could have done.

The leisure for this long continued research has been due to the generosity, scientific disinterestedness, and personal kindness of my former chief, Professor Spencer F. Baird, and of my present revered director, Major J. W. Powell, whose patience and helpfulness through years of struggle, ill-health, and delay could not adequately be repaid by even the complete carrying out of the series of works herein projected and prefaced. To them and to Professor W J McGee, who has aided and fostered this work in every possible way, I owe continual gratitude.

MYTHS[1]

THE GENESIS OF THE WORLDS, OR THE BEGINNING OF NEWNESS.

Before the beginning of the new-making, Áwonawílona (the Maker and Container of All, the All-father Father), solely had being. There was nothing else whatsoever throughout the great space of the ages save everywhere black darkness in it, and everywhere void desolation.

In the beginning of the new-made, Áwonawílona conceived within himself and thought outward in space, whereby mists of increase, steams potent of growth, were evolved and uplifted. Thus, by means of his innate knowledge, the All-container made himself in person and form of the Sun whom we hold to be our father and who thus came to exist and appear. With his appearance came the brightening of the spaces with light, and with the brightening of the spaces the great mist-clouds were thickened together and fell, whereby was evolved water in water; yea, and the world-holding sea.

With his substance of flesh (*yépnane*) outdrawn from the surface of his person, the Sun-father formed the seed-stuff of twain worlds, impregnating therewith the great waters, and lo! in the heat of his light these waters of the sea grew green and scums (*k'yanashótsiyallawe*) rose upon them, waxing wide and weighty until, behold! they became Áwitelin Tsíta, the "Four-fold Containing Mother-earth," and Ápoyan Tä'chu, the "All-covering Father-sky."

THE GENESIS OF MEN AND THE CREATURES.

From the lying together of these twain upon the great world waters, so vitalizing, terrestrial life was conceived; whence began all beings of earth, men and the creatures, in the Four-fold womb of the World (Áwiten Téhu'hlnakwi).

Thereupon the Earth-mother repulsed the Sky-father, growing big and sinking deep into the embrace of the waters below, thus separating from the Sky-father in the embrace of the waters above. As a woman forebodes evil for her first-born ere born, even so did the Earth-mother forebode, long withholding from birth her myriad progeny and meantime seeking counsel with the Sky-father. "How," said they to

[1] As stated more fully in the introductory paragraphs, notes giving the etymologies of native terms and explaining and amplifying obscure or brief allusions and presenting the special sense in which certain expressions and passages are used will be given in the second part of this paper, to appear in the future.

one another, "shall our children, when brought forth, know one place from another, even by the white light of the Sun-father?"

Now like all the surpassing beings (*píkwaiyin áhâi*) the Earth-mother and the Sky-father were *'hlímna* (changeable), even as smoke in the wind; transmutable at thought, manifesting themselves in any form at will, like as dancers may by mask-making.

Thus, as a man and woman, spake they, one to the other. "Behold!" said the Earth-mother as a great terraced bowl appeared at hand and within it water, "this is as upon me the homes of my tiny children shall be. On the rim of each world-country they wander in, terraced mountains shall stand, making in one region many, whereby country shall be known from country, and within each, place from place. Behold, again!" said she as she spat on the water and rapidly smote and stirred it with her fingers. Foam formed, gathering about the terraced rim, mounting higher and higher. "Yea," said she, "and from my bosom they shall draw nourishment, for in such as this shall they find the substance of life whence we were ourselves sustained, for see!" Then with her warm breath she blew across the terraces; white flecks of the foam broke away, and, floating over above the water, were shattered by the cold breath of the Sky-father attending, and forthwith shed downward abundantly fine mist and spray! "Even so, shall white clouds float up from the great waters at the borders of the world, and clustering about the mountain terraces of the horizons be borne aloft and abroad by the breaths of the surpassing of soul-beings, and of the children, and shall hardened and broken be by thy cold, shedding downward, in rain-spray, the water of life, even into the hollow places of my lap! For therein chiefly shall nestle our children mankind and creature-kind, for warmth in thy coldness."

Lo! even the trees on high mountains near the clouds and the Sky-father crouch low toward the Earth-mother for warmth and protection! Warm is the Earth-mother, cold the Sky-father, even as woman is the warm, man the cold being!

"Even so!" said the Sky-father; "Yet not alone shalt *thou* helpful be unto our children, for behold!" and he spread his hand abroad with the pålm downward and into all the wrinkles and crevices thereof he set the semblance of shining yellow corn-grains; in the dark of the early world-dawn they gleamed like sparks of fire, and moved as his hand was moved over the bowl, shining up from and also moving in the depths of the water therein. "See!" said he, pointing to the seven grains clasped by his thumb and four fingers, "by such shall our children be guided; for behold, when the Sun-father is not nigh, and thy terraces are as the dark itself (being all hidden therein), then shall our children be guided by lights—like to these lights of all the six regions turning round the midmost one—as in and around the midmost place, where these our children shall abide, lie all the other regions of space! Yea! and even as these grains gleam up from the

water, so shall seed-grains like to them, yet numberless, spring up from thy bosom when touched by my waters, to nourish our children." Thus and in other ways many devised they for their offspring.

THE GESTATION OF MEN AND THE CREATURES.

Anon in the nethermost of the four cave-wombs of the world, the seed of men and the creatures took form and increased; even as within eggs in warm places worms speedily appear, which growing, presently burst their shells and become as may happen, birds, tadpoles or serpents, so did men and all creatures grow manifoldly and multiply in many kinds. Thus the lowermost womb or cave-world, which was Ánosin téhuli (the womb of sooty depth or of growth-generation, because it was the place of first formation and black as a chimney at night time, foul too, as the internals of the belly), thus did it become overfilled with being. Everywhere were unfinished creatures, crawling like reptiles one over another in filth and black darkness, crowding thickly together and treading each other, one spitting on another or doing other indecency, insomuch that loud became their murmurings and lamentations, until many among them sought to escape, growing wiser and more manlike.

THE FORTHCOMING FROM EARTH OF THE FOREMOST OF MEN.

Then came among men and the beings, it is said, the wisest of wise men and the foremost, the all-sacred master, Póshaiyaŋk'ya, he who appeared in the waters below, even as did the Sun-father in the wastes above, and who arose from the nethermost sea, and pitying men still, won upward, gaining by virtue of his (innate) wisdom-knowledge issuance from that first world-womb through ways so dark and narrow that those who, seeing somewhat, crowded after, could not follow, so eager were they and so mightily did they strive with one another! Alone, then, he fared upward from one womb (cave) to another out into the great breadth of daylight. There, the earth lay, like a vast island in the midst of the great waters, wet and unstable. And alone fared he forth dayward, seeking the Sun-father and supplicating him to deliver mankind and the creatures there below.

THE BIRTH FROM THE SEA OF THE TWAIN DELIVERERS OF MEN.

Then did the Sun-father take counsel within himself, and casting his glance downward espied, on the great waters, a Foam-cap near to the Earth-mother. With his beam he impregnated and with his heat incubated the Foam-cap, whereupon she gave birth to Úanam Achi Píahkoa, the Beloved Twain who descended; first, Úanam Éhkona, the Beloved Preceder, then Úanam Yáluna, the Beloved Follower, Twin brothers of Light, yet Elder and Younger, the Right and the Left, like to question and answer in deciding and doing. To them the

Sun-father imparted, still retaining, control-thought and his own knowledge-wisdom, even as to the offspring of wise parents their knowingness is imparted and as to his right hand and his left hand a skillful man gives craft freely surrendering not his knowledge. He gave them, of himself and their mother the Foam-cap, the great cloud-bow, and for arrows the thunderbolts of the four quarters (twain to either), and for buckler the fog-making shield, which (spun of the floating clouds and spray and woven, as of cotton we spin and weave) supports as on wind, yet hides (as a shadow hides) its bearer, defending also. And of men and all creatures he gave them the fathership and dominion, also as a man gives over the control of his work to the management of his hands. Well instructed of the Sun-father, they lifted the Sky-father with their great cloud-bow into the vault of the high zenith, that the earth might become warm and thus fitter for their children, men and the creatures. Then along the trail of the sun-seeking Póshaiyaŋk'ya, they sped backward swiftly on their floating fog-shield, westward to the Mountain of Generation. With their magic knives of the thunderbolt they spread open the uncleft depths of the mountain, and still on their cloud-shield—even as a spider in her web descendeth—so descended they unerringly, into the dark of the under-world. There they abode with men and the creatures, attending them, coming to know them, and becoming known of them as masters and fathers, thus seeking the ways for leading them forth.

THE BIRTH AND DELIVERY OF MEN AND THE CREATURES.

Now there were growing things in the depths, like grasses and crawling vines. So now the Beloved Twain breathed on the stems of these grasses (growing tall, as grass is wont to do toward the light, under the opening they had cleft and whereby they had descended), causing them to increase vastly and rapidly by grasping and walking round and round them, twisting them upward until lo! they reach forth even into the light. And where successively they grasped the stems ridges were formed and thumb-marks whence sprang branching leaf-stems. Therewith the two formed a great ladder whereon men and the creatures might ascend to the second cave-floor, and thus not be violently ejected in after-time by the throes of the Earth-mother, and thereby be made demoniac and deformed.

Up this ladder, into the second cave-world, men and the beings crowded, following closely the Two Little but Mighty Ones. Yet many fell back and, lost in the darkness, peopled the under-world, whence they were delivered in after-time amid terrible earth shakings, becoming the monsters and fearfully strange beings of olden time. Lo! in this second womb it was dark as is the night of a stormy season, but larger of space and higher than had been the first, because it was nearer the navel of the Earth-mother, hence named K'ólin tehuli (the Umbilical-womb, or the Place of Gestation). Here again men and the beings

increased and the clamor of their complainings grew loud and beseeching. Again the Two, augmenting the growth of the great ladder, guided them upward, this time not all at once, but in successive bands to become in time the fathers of the six kinds of men (the yellow, the tawny gray, the red, the white, the mingled, and the black races), and with them the gods and creatures of them all. Yet this time also, as before, multitudes were lost or left behind. The third great cave-world, whereunto men and the creatures had now ascended, being larger than the second and higher, was lighter, like a valley in starlight, and named Áwisho tehuli—the Vaginal-womb, or the Place of Sex-generation or Gestation. For here the various peoples and beings began to multiply apart in kind one from another; and as the nations and tribes of men and the creatures thus waxed numerous as before, here, too, it became overfilled. As before, generations of nations now were led out successively (yet many lost, also as hitherto) into the next and last world-cave, Tépahaian tehuli, the Ultimate-uncoverable, or the Womb of Parturition.

Here it was light like the dawning, and men began to perceive and to learn variously according to their natures, wherefore the Twain taught them to seek first of all our Sun-father, who would, they said, reveal to them wisdom and knowledge of the ways of life—wherein also they were instructing them as we do little children. Yet like the other cave-worlds, this too became, after long time, filled with progeny; and finally, at periods, the Two led forth the nations of men and the kinds of being, into this great upper world, which is called Ték'ohaian úlahnane, or the World of Disseminated Light and Knowledge or Seeing.

THE CONDITION OF MEN WHEN FIRST INTO THE WORLD OF DAYLIGHT BORN.

Eight years made the span of four days and four nights when the world was new. It was while yet such days and nights continued that men were led forth, first in the night, that it might be well. For even when they saw the great star (*móyächun 'hlána*), which since then is spoken of as the lying star (*mókwanosona*), they thought it the Sun himself, so burned it their eyeballs! Men and the creatures were nearer alike then than now: black were our fathers the late born of creation, like the caves from which they came forth; cold and scaly their skins like those of mud-creatures; goggled their eyes like those of an owl; membranous their ears like those of cave-bats; webbed their feet like those of walkers in wet and soft places; and according as they were elder or younger, they had tails, longer or shorter. They crouched when they walked, often indeed, crawling along the ground like toads, lizards and newts; like infants who still fear to walk straight, they crouched, as before-time they had in their cave-worlds, that they might not stumble and fall, or come to hurt in the uncertain light thereof. And when the morning star rose they blinked excessively as they beheld its

brightness and cried out with many mouth-motionings that surely now the Father was coming; but it was only the elder of the Bright Ones, gone before with elder nations and with his shield of flame, heralding from afar (as we herald with wet shell scales or crystals) the approach of the Sun-father! And when, low down in the east the Sun-father himself appeared, what though shrouded in the midst of the great world waters, they were so blinded and heated by his light and glory that they cried out to one another in anguish and fell down wallowing and covering their eyes with their bare hands and arms. Yet ever anew they looked afresh to the light and anew struggled toward the sun as moths and other night creatures seek the light of a camp fire; yea, and what though burned, seek ever anew that light!

Thus ere long they became used to the light, and to this high world they had entered. Wherefore, when they arose and no longer walked bended, lo! it was then that they first looked full upon one another and in horror of their filthier parts, strove to hide these, even from one another, with girdles of bark and rushes; and when by thus walking only upon their hinder feet the same became bruised and sore, they sought to protect them with plaited soles (sandals) of yucca fiber.

THE ORIGIN OF PRIESTS AND OF KNOWLEDGE.

It was thus, by much devising of ways, that men began to grow knowing in many things, and were instructed by what they saw, and so became wiser and better able to receive the words and gifts of their fathers and elder brothers, the gods, Twain and others, and priests. For already masters-to-be were amongst them. Even in the dark of the under-worlds such had come to be; as had, indeed, the various kinds of creatures-to-be, so these. And according to their natures they had found and cherished things, and had been granted gifts by the gods; but as yet they knew not the meaning of their own powers and possessions, even as children know not the meanings and right uses of the precious or needful things given them; nay nor yet the functions of their very parts! Now in the light of the Sun-father, persons became known from persons, and these things from other things; and thus the people came to know their many fathers among men, to know them by themselves or by the possessions they had.

Now the first and most perfect of all these fathers among men after Póshaiyaŋk'ya was Yanáuluha, who brought up from the under-world water of the inner ocean, and seeds of life-production and growing things; in gourds he brought these up, and also things containing the "of-doing-powers."

THE ORIGIN OF THE RAVEN AND THE MACAW, TOTEMS OF WINTER AND SUMMER.

He who was named Yanáuluha carried ever in his hand a staff which now in the daylight appeared plumed and covered with feathers

of beautiful colors—yellow, blue-green, and red, white, black, and varied. Attached to it were shells and other potent contents of the under-world. When the people saw all these things and the beautiful baton, and heard the song-like tinkle of the sacred shells, they stretched forth their hands like little children and cried out, asking many questions.

Yanáuluha, and other priests (*shiwanáteuna*) having been made wise by teaching of the masters of life (god-beings) with self-magic-knowing (*yam tsépan ánikwanan*), replied: "It is a staff of extension, wherewith to test the hearts and understandings of children." Then he balanced it in his hand and struck with it a hard place and blew upon it. Amid the plumes appeared four round things, seeds of moving beings, mere eggs were they, two blue like the sky or turkis; two dun-red like the flesh of the Earth-mother.

Again the people cried out with wonder and ecstasy, and again asked they questions, many.

"These be," said he who was named Yanáuluha, "the seed of living things; both the cherishers and annoyancers, of summer time; choose ye without greed which ye will have for to follow! For from one twain shall issue beings of beautiful plumage, colored like the verdure and fruitage of summer; and whither they fly and ye follow, shall be everlastingly manifest summer, and without toil, the pain whereof ye ken not, fields full fertile of food shall flourish there. And from the other twain shall issue beings evil, uncolored, black, piebald with white; and whither these two shall fly and ye follow, shall strive winter with summer; fields furnished only by labor such as ye wot not of shall ye find there, and contended for between their offspring and yours shall be the food-fruits thereof.

"The blue! the blue!" cried the people, and those who were most hasty and strongest strove for the blue eggs, leaving the other eggs for those who had waited. "See," said they as they carried them with much gentleness and laid them, as one would the new-born, in soft sand on the sunny side of a cliff, watching them day by day, "precious of color are these; surely then, of precious things they must be the seed!" And "Yea verily!" said they when the eggs cracked and worms issued, presently becoming birds with open eyes and with pin-feathers under their skins, "Verily we chose with understanding, for see! yellow and blue, red and green are their dresses, even seen through their skins!" So they fed the pair freely of the food that men favor—thus alas! cherishing their appetites for food of all kinds! But when their feathers appeared they were *black* with white bandings; for ravens were they! And they flew away mocking our fathers and croaking coarse laughs!

And the other eggs held by those who had waited and by their father Yanáuluha, became gorgeous macaws and were wafted by him with a toss of his wand to the far southward summer-land. As

father, yet child of the macaw, he chose as the symbol and name of himself and as father of these his more deliberate children—those who had waited—the macaw and the kindred of the macaw, the Múla-kwe; whilst those who had chosen the ravens became the Raven-people, or the Kâ'kâ-kwe.

Thus first was our nation divided into the People of Winter and the People of Summer. Of the Winter those who chose the raven, who were many and strong; and of the Summer those who cherished the macaw, who were fewer and less lusty, yet of prudent understanding because more deliberate. Hence, Yanáuluha their father, being wise, saw readily the light and ways of the Sun-father, and being made partaker of his breath, thus became among men as the Sun-father is among the little moons of the sky; and speaker to and of the Sun-father himself, keeper and dispenser of precious things and commandments, Pékwi Shíwani Éhkona (and Earliest Priest of the Sun). He and his sisters became also the seed of all priests who pertain to the Midmost clan-line of the priest-fathers of the people themselves "masters of the house of houses." By him also, and his seed, were established and made good the priests-keepers of things.

THE ORIGIN AND NAMING OF TOTEM-CLANS AND CREATURE KINDS, AND THE DIVISION AND NAMING OF SPACES AND THINGS.

The Twain Beloved and priest fathers gathered in council for the naming and selection of man-groups and creature-kinds (*tánawe*), spaces, and things. Thus determined they that the creatures and things of summer and the southern space pertained to the Southern people, or Children of the Producing Earth-mother; and those of winter and northern space, to the Winter people, or Children of the Forcing or Quickening Sky-father.

Of the Children of Summer, some loved and understood most the Sun, hence became the fathers of the Sun people (Yä'tok'ya-kwe). Some loved more the water, and became the Toad people (Ták'ya-kwe), Turtle people (Étâa-kwe), or Frog people (Ták'yaiuna-kwe), who so much love the water. Others, again loved the seeds of earth and became the People of Seed (Tâatém'hlanah-kwe), such as those of the First-growing grass (Pétâa-kwe, now Aíyaho-kwe), and of the Tobacco (Ána-kwe). Yet still others loved the warmth and became the Fire or Badger people (Tónashi-kwe). According, then, to their natures and inclinations or their gifts from below or of the Masters of Life, they chose or were chosen for their totems.

Thus, too, it was with the People of Winter or the North. They chose, or were chosen and named, according to their resemblances or aptitudes; some as the Bear people (Aíŋshi-kwe), Coyote people (Súski-kwe), or Deer people (Shóhoita-kwe); others as the Crane people (Kâ'lokta-kwe), Turkey people (Tóna-kwe) or Grouse people (Póyi-

kwe). In this wise it came to pass that the Áshiwe were divided of old in such wise as are their children today, into *ánotiwe* (clans or kinties) of brothers and sisters who may not marry one another, but from one to another of kin. Yea, and as the Earth-mother had increased and kept within herself all beings, cherishing them apart from their father even after they came forth, so were these our mothers and sisters made the keepers of the kin-names and of the seed thereof, nor may the children of each be cherished by any others of kin.

Now the Beloved Foremost Ones (Úan Éhkon Áteona) of these clans were prepared by instruction of the gods and the fathers of the house of houses and by being breathed of them (*púak'yanapk'ya*), whereby they became *áshiwani* or priests also, but only the priests of possession, master keepers of sacred things and mysteries (*tíkitlapon ámosi*), each according to his nature of kinship. It was thus that the warmth-wanting (*ték'yä'hlna shema*) Badger-people were given the great shell (*tsúlikéinan 'hlana*), the heart or navel of which is potent or sensitive of fire, as of the earthquake and the inner fire is the coiled navel of the Earth-mother. On the sunny sides of hills burrow the badgers, finding and dwelling amongst the dry roots whence is fire. Thus the "Two Badgers" were made keepers of the sacred heart-shell (*súti k'ili achi*), makers and wardens of fire. So, too, were the Bear, Crane, and Grouse people given the *múetone*, or the contained seed-substance of hail, snow and new soil (for the bear sleeps, no longer guarding when winter comes, and with the returning crane, in the wake of the duck, comes winter in the trail of the white growing grouse). So, to the Toad and other water people, descended to them from Yanáuluha the *k'yáetone*, or the contained seed-substance of water; and to the Átâa-kwe, or All-seed-people, especially to the First-growing-grass people and the Tobacco people, was given of him also, the *chúetone*, or the contained seed-substance of corn grains.

THE ORIGIN OF THE COUNCILS OF SECRECY OR SACRED BROTHERHOODS.

Now when the foremost ones of more than one of these kin clans possessed a contained or sacred seed-substance, they banded together, forming a society for the better use and keeping of its medicine and its secret (forbidden) mysteries, and for the guidance and care thereby of their especial children. Thus, leading ones of the Bear people, Crane people, and Grouse people became the 'Hlóetâ-kwe, or Bearers of the Ice-wands as they are sometimes called, whose prayers and powers bring winter, yet ward off its evils to the flesh and fearsomeness to the soul. But at first, only four were the bands of priest-keepers of the mysteries: Shíwana-kwe, or the Priesthood of Priest people; Sániak'ya-kwe, or the Priesthood of the Hunt, who were of the Coyote, Eagle, and Deer kin, Keepers of the Seed-substance of Game; Áchiak'ya-

kwe or the Great Knife people, makers and defenders of pathways for the people; and Néwe-kwe, keepers of magic medicines and knowledge invincible of poison and other evil, whose first great father was Paíyatuma, God of Dew and the Dawn, himself. Out of these and of other clans were formed in later days by wisdom of the Father of Medicines and Rites (the great Póshaiyaŋk'ya, when he returned, all as is told in other talk of our olden speech) all other societies, both that of the Middle, and the Twain for each of all the other six regions (*tem'halatékwiwe*,) the Tabooed and Sacred Thirteen. But when all was new, men did not know the meanings of their possessions, or even of the commandments (*haítoshnawe*); even as children know not the prayers (*téusupénawe*). These they must first be taught, that in later days, when there is need therefor, they may know them and not be poor.

THE UNRIPENESS AND INSTABILITY OF THE WORLD WHEN STILL YOUNG.

As it was with men and the creatures, so with the world; it was young and unripe (*k'yaíyuna*). Unstable its surface was, like that of a marsh; dank, even the high places, like the floor of a cavern, so that seeds dropped on it sprang forth, and even the substance of offal became growing things.

Earthquakes shook the world and rent it. Beings of sorcery, demons and monsters of the under-world fled forth. Creatures turned fierce, becoming beasts of prey, wherefore others turned timid, becoming their quarry; wretchedness and hunger abounded, black magic, war, and contention entered when fear did into the hearts of men and the creatures. Yea, fear was everywhere among them, wherefore, everywhere the people, hugging in dread their precious possessions, became wanderers they, living on the seeds of grasses, eaters of dead and slain things! Yet still, they were guided by the Two Beloved, ever in the direction of the east, told and taught that they must seek, in the light and under the pathway of the Sun, the middle of the world, over which alone could they find the earth stable, or rest them and bide them in peace.

THE HARDENING OF THE WORLD, AND THE FIRST SETTLEMENT OF MEN.

When the tremblings grew stilled for a time, the people were bidden to gather and pause at the First of Sitting-places, which was named K'éyatiwankwi (Place of upturning or elevation). Yet still poor and defenseless and unskilled were the children of men, still moist and ever-anon unstable the world they abode in. Still also, great demons and monsters of prey fled violently forth in times of earthquake (*ánukwaík'yanak'ya*) and menaced all wanderers and timid creatures. Therefore the Beloved Twain took counsel one with the other and with

the Sun-father, and instructed by him, the elder said to the younger, "Brother, behold!

That the earth be made safer for men, and more stable,
Let us shelter the land where our children be resting,
Yea! the depths and the valleys beyond shall be sheltered
By the shade of our cloud-shield! Let us lay to its circle
Our firebolts of thunder, aimed to all the four regions,
Then smite with our arrows of lightning from under.
Lo! the earth shall heave upward and downward with thunder!
Lo! fire shall belch outward and burn the world over,
And floods of hot water shall seethe swift before it!
Lo! smoke of earth-stenches shall blacken the daylight
And deaden the senses of them else escaping
And lessen the number of fierce preying monsters!
That the earth be made safer for men, and more stable."

"It were well," said the younger, ever eager, and forthwith they made ready as they had between themselves devised. Then said the elder to the younger,

"Wilt thou stand to the right, or shall I, younger brother?"
"I will stand to the right!" said the younger, and stood there.
To the left stood the elder and when all was ready,
'Hluúa they let fly at the firebolts, their arrows!
Deep bellowed the earth, heaving upward and downward.
"It is done," said the elder. "It is well," said the younger.

Dread was the din and stir. The heights staggered and the mountains reeled, the plains boomed and crackled under the floods and fires, and the high hollow-places, hugged of men and the creatures, were black and awful, so that these grew crazed with panic and strove alike to escape or to hide more deeply. But ere-while they grew deafened and deadened, forgetful and asleep! A tree lighted of lightning burns not long! Presently thick rain fell, quenching the fires; and waters washed the face of the world, cutting deep trails from the heights downward, and scattering abroad the wrecks and corpses of stricken things and beings, or burying them deeply. Lo! they are seen in the mountains to this day; and in the trails of those fierce waters cool rivers now run, and where monsters perished lime of their bones (*áluwe*—calcareous nodules in malpais or volcanic tuff) we find, and use in food stuff! Gigantic were they, for their forms little and great were often burned or shriveled and contorted into stone. Seen are these, also, along the depths of the world. Where they huddled together and were blasted thus, their blood gushed forth and flowed deeply, here in rivers, there in floods; but it was charred and blistered and blackened by the fires, into the black rocks of the lower mesas (*ápkwina*, lava or malpais). There were vast plains of dust, ashes and cinders, reddened as is the mud of a hearth-place. There were great banks of clay and soil burned to hardness—as clay is when baked in the kiln-mound,—blackened, bleached or stained yellow, gray, red, or white, streaked and banded, bended or twisted. Worn and broken by

the heavings of the under-world and by the waters and breaths of the ages, they are the mountain-terraces of the Earth-mother, "dividing country from country!" Yet many were the places behind and between these—dark canyons, deep valleys, sunken plains—unharmed by the fires, where they swerved or rolled higher—as, close to the track of a forest-fire, green grow trees and grasses, and even flowers continue to bloom. Therein, and in the land sheltered by the shield, tarried the people, awakened, as from fearful dreams. Dry and more stable was the world now, less fearsome its lone places; since, changed to rock were so many monsters of prey (some shriveled to the size of insects; made precious as amulets for the hunter and warrior, as told in other talks of our ancient speech).

THE BEGINNING OF THE SEARCH FOR THE MIDDLE OF THE WORLD, AND THE SECOND TARRYING OF MEN.

But ever and anon the earth trembled anew in that time, and the people troubled.

"Thus, being, it is not well," said the Two. "Let us again seek the Middle." So, they led their myriads far eastward and tarried them at Tésak'ya Yäla (Place of nude mountains).

THE LEARNING OF WAR, AND THE THIRD TARRYING.

Yet soon again the world rumbled, and again they led the way into a country and place called Támëlan K'yaíyawan (Where tree boles stand in the midst of the waters). There the people abode for long, saying (poor people!) "This is the Middle!" Therefore they built homes. At times they met people who had gone before, thus learning much of ways in war, for in the fierceness that had entered their hearts with fear, they deemed it not well, neither liked they to look upon strangers peacefully. And many strange things also were learned and happened there, that are told in other speeches of the ancient talk.

Having fought and grown strong, lo! when at last the earth groaned and the conches sounded warning, and the Twain bade them forth, forsooth! they murmured much, and many (foredoomed!), turned headstrong and were left to perish miserably in their own houses as do rats in falling trees, or flies in forbidden food!

THE MEETING OF THE PEOPLE OF DEW, AND THE FOURTH TARRYING.

But the greater company went obediently forward, until at last they neared Shípololon K'yaía (Steam mist in the midst of the waters). Behold! they saw as they journeyed, the smoke of men's hearth-fires and a great assemblage of houses scattered over the hills before them! And when they came closer they met dwellers in those places, nor looked peacefully upon them—having erstwhile in their last standing-

place, had touch of war—but challenged them rudely, to know, forsooth, who they were and why there.

THE GENERATION OF THE SEED OF SEEDS, OR THE ORIGIN OF CORN.

"We are the People of Seed," said these strangers, replying to our fathers of old, "born elder brothers of ye, and led of the gods!"

"Nay," contended our fathers, "verily, we are led of the gods and of *us* are the Seed people and the substance of seed whereof our wise elders carry the potencies." Whereupon they grew yet more angry, so dark were they of understanding!

The people who called themselves "Of the Seed"—who were none others than the "Drinkers of the Dew of Grasses"—bade them pause. "Behold!" said they, "we have powers above yours, yet without your aid we can not exert them; even as the mothers of men may not be fertile save of the fathers. Ye are our younger brothers, for verily so are *your* People of Seed, and more precious than they know, are they and their sacred keepings, ye—unwittingly, alack!—so boast of; even as we are more wise than ye are and in ourselves quickening withal, for ye are, like virgins, unthinking, yet fertile. Now go to! Let us look peacefully upon one another. Do ye, therefore, try first your powers with the sacred things ye carry according as ye have been instructed or may best devise; then will we according to our knowledge of these things and our own practices try our powers with them also, showing forth our customs unto you."

At last, after much wrangling and council, the people agreed to this. And they set apart the time, eight days (as now days are numbered) wherein to make their preparations, which was well; for therefrom resulted to them great gain, yea, and the winning of these stranger villagers, and by wise and peaceful acts rather than by war and the impetuosity of right hands. In the borders of the plain in the midst of cedars (fuel furnishers of the food-maturing fire, these!) and under the shade of Hemlocks (Tree-goddesses of the food-growing water, these!) they encamped. And at the foot of the Hemlocks, facing the sunlight, they builded them of cedar boughs a great bower: like to it, only lesser, are those whence we watch and foster the ripening of our corn; for from their bower thus fashioned, our fathers and mothers, the priests and priest-matrons of old, watched and labored for the first birth of corn, and in this wondrous wise, as young parents watch for the birth of their children, though not knowing of what kind or favor they will be, nevertheless expectantly of heart; and as we now watch the fulfilment of our harvests.

So, the seed-priests and master-keepers of the possessions, and their fathers (those of the house of houses) fasted and intently contemplated their sacred substances to divine the means thereof. And it seemed good to them to cut wands of the spaces, painting them

significantly and pluming them in various ways with the feathers of the cloud and summer sun-loving birds (Ólowik'ya Wówe Pékwi Áshiwani), thinking thereby to waft the breath of their prayers and incantations (taught of the Surpassing Ones all in the new time of the world) and to show forth their meanings even so far as unto the ancient sitting spaces of those who first taught them.

When all else was prepared, they made a shrine around their *múetone* (or medicine seed of hail and soil) their *k'yáetone* (or medicine seed of the water and rain) and their *chúetone* (or medicine seed of grains). And around these, and reaching out toward the Sun before them, they set their plumed wands of message. For the plain was dry and barren, and they wanted fresh soil by the hail torrents, moisture by the rain, and growth of seed-substance, that they might the better exhibit their powers to these strangers; if perchance, in response to their labors and beseechings, these things would be vouchsafed them. Therefore, that the meaning of their beseechings might be the more plain and sure of favor, certain ones of the sage priests, sought out and placed the largest and most beautifully colored grass seeds they could find among the stores of their way-farings, in the gourd with the *chúetone*, and then cut from branches of the easy growing cottonwood and willow, gleaned from the ways of water, goodly wands which they plumed and painted, like in color to each kind of seed they had selected; yellow, green, red, white, black, speckled, and mottled; one for each side of the sacred gourd, one to be laid upon it, one to be laid under it, and one to be placed within it; and as soon as finished, thus they disposed the wands.

Now when night came, these master-priests took the *chúetone*—all secretly, whilst the others were drowsy—and carried it, with the plumed wands they had made, out into the plain, in front of the bower. There they breathed into these things the prayers and over them softly intoned the incantations which had been taught them in the new time of the world. Then they placed the *chúetone* on the ground of the plain and on each side of it, by the light of the seven great stars which were at that time rising bright above them, they planted one of the plumed wands with the seeds of its color; first, the brightest, yellow with the yellow grass seeds, on the north; then the blue with the green grass seeds, on the west; then the red with the red seeds, to the south, and the white with the white seeds to the east; but the other three plumed wands they could not plant, one above, the other below, and the last within the gourd; so looking at the stars they saw how that they were set, four of them as though around a gourd like their own, and three others as though along its handle! "*Há! Chukwé!*" said they. "'Tis a sign, mayhap, of the Sky-father!" whereupon they set each of the others in a line, the black one with its seeds of black, nearest to the sacred gourd below the handle; the speckled one with its spotted seeds next, on the other side of the handle, and the mottled one with its

dappled seeds far out at the end of the handle, that it might (being of the colors of all the others) point out each of them, as it were, and lead them all!

And when, on the morrow, the watchers saw the plumes standing there all beautiful in the plain, and asked who planted them, and for what, the priests replied, "Verily they were planted in the night, while ye heedlessly drowsed, by the seven stars." Thereat the people, mistaking their meaning, exclaimed, "Behold! the seed wands of the stars themselves!" and they joyed in the omen that their prayers had been heard so far. And lo! during the eight days and nights there arose thick mists, hail and rain descended until torrents poured down from the mountains bringing new soil and spreading it evenly over the plain. And when on the morning of the ninth day the clouds rolled away, "*Eluu!*" shouted our fathers of the Seed kin to the stranger people; "Water and new soil bring we, where erst was barren hardness; yea, even grasses, tall and plumed as were our wands, and spiked with seed, for the grass seed had sprouted and the new wands taken root and grown, and now had long feathery blades and tall, tasseled stems, waving in the wind.

"Yea, verily!" cried the People of the First-growing-grass kin (Aik'yaho-kwe), chief of the clans of Seed, "we *are* the People of the Seed!"

But the strangers, heeding not their boastings, replied, "Yea, verily, enough! It is well! Truly water and new soil ye have brought, and grasses growing great therefrom, yet ye have not brought forth new life therefor of the flesh of men or the seed of seeds! Come now, let us labor together, in order that what ye have begun may be perfected. New soil and the seed of its production, the seed of water, yea even the substance of seed itself we had not, yet of the seed of seed we are verily the people, and our maidens are the mothers thereof, as ye shall see."

Then they, too, set apart eight days, during which to prepare for their custom, and they further said, "That we may be perfect in the plenishing and generation of the seed of seeds, send us forth, O, ye comers, a youth of the kin of Water and of those who hold possession of the precious *k'yáetone*, which give unto us likewise, that we join it to the *chúetone* ye have placed in the midst of the growing plants, according to our understanding of its meaning and relation. And let the youth be goodly and perfect and whole of seed."

Therefore the fathers of the people chose forth, it is said, Yápotuluha, of the clans of Water, foster child of the great Sun-priest Yanáuluha, and named of him. And into his hand they gave the *k'yáetone* and certain of their wands of worship, and sent him to the strangers glorious to look upon. Now there were in the village of the stranger Seed people seven maidens, sisters of one another, virgins of one house, and foster children of Paiyatuma (the God of Dew) himself. And they were surpassingly beautiful, insomuch so that they

were likened to the seven bright stars and are sung of in the songs of the Seed people and told of in their stories. They, too, were chosen and breathed upon by all the fathers and matrons of the Seed, and with the youth Yápotuluha, instructed in the precious rites and incantations of their custom. And during all the time of preparation rain fell as before, only gently and warm, and on the eighth day the matrons and fathers led the maidens and youth, all beautifully arrayed, down into the plain before the bower where watched the people and grew the grasses. And there they danced and were breathed of the sacred medicine seeds. All through the night backward and forward danced they to the song line of the elders, and in accordance therewith by the side of the growing plants, motioning them upward with their magic wands and plumes, as we, with implements of husbandry, encourage the growth upward of the corn plants today. As time went on, the matron of the dance led the youth and the first maiden apart, and they grasped, one on either side, the first plants, dancing around them, gently drawing them upward as they went, even as the Two Beloved had caused to grow the canes of the under-world. So also did the youth and each maiden in turn grasp the other plants in their turn, until all had grown to the tallness of themselves and were jointed where they had grasped them; yea, and leaved as with waving plumes of the macaw himself. And now, in the night, the keepers of the great shells (of the Badger kin), brought forth fire with their hands from roots, and kindled it in front of the bower toward the east, that its heat might take the place of the Sun and its light shine brightly on the dancers, making their acts verily alive; and as the dawn approached, the youth and first maiden were led apart as before by the Mother-making matron, and together embraced the first of the full grown plants, and so, in turn, the youth and each of the other maidens embraced the other plants.

And as they embraced the first plant, the fire flamed brightly, with the first catching and flush of the wood, and yellow was its light; and as they embraced the second plant, the flames were burning smokily with the fuller grasping of the wood, and blue was the light; and as they were embracing the third plant, the fire reached its fullness of mastery over the wood, and red was its light; and as they were embracing the fourth plant, the fire was fumeless and triumphant over the wood, and white was its light; and as they were embracing the fifth plant, the fire gave up its breath in clouds of sparks, and streaked, of many colors, was its light; and as they were embracing the sixth plant, the fire swooned and slept, giving more heat, as 'twere, than light, thus somber was the light, yet, as they were embracing the seventh plant, it wakened afresh, did the fire, in the wind of the morning, and glowed as does the late fire of the wanderer, with a light of *all* the colors.

Now, when the day dawned, lo! where the mid-persons of the youth and the maidens had touched most unitedly and warmly the plants,

new parts appeared to the beholders, showing, through their coverings, many colors, soft hair shrouding them, as if to make precious their beauty.

Whilst the people still gazed at these, wondering, out from the East-land came Paíyatuma and Ténatsali of the All-colored flowers (God of the Seasons), followed by Kwélele with his flame-potent fire-wand. Paíyatuma touched the plants with the refreshing breath of his flute; Ténatsali with the flesh-renewing breath of his flowers; Kwélele, with the ripening breath of his torch, whereby the new parts were hardened, some to fruitfulness; others, being too closely touched, burned to the very heat of generative warmth, unfruitful in itself, but fruitful making! Then, as Paíyatuma waved his flute, lo! following Ténatsali, the maidens and the attendant Kwélele went forth and disappeared in the mist of the morning. As they vanished, Paíyatuma turned to where, full in the light of the rising sun, stood the seven plants. Lithe and tall stood he there beside them like a far journeyer, and said to the awed watchers:

Lo! ye children of men and the Mother,
Ye Brothers of Seed,
Elder, younger,
Behold the *seed plants of all seeds!*
The grass-seeds ye planted, in secret,
Were seen of the stars and the regions,
Are shown in the forms of these tassels!
The plumes that ye planted beside them
Were felt in the far away spaces,
Are shown in the forms of their leaf-blades!
But the seed that ye see growing from them,
Is the gift of my seven bright maidens,
The stars of the house of my children!
Look well, that ye cherish their persons,
Nor change ye the gift of their being,—
As fertile of flesh for all men
To the bearing of children for men,—
Lest ye lose them, to seek them in vain!
Be ye brothers ye people, and people;
Be ye happy ye Priests of the Corn!
Lo! the seed of all seed-plants is born!

As the people eagerly looked, the mists of the morning were seen to be clearing away, and gone within them, even as his voice, was Paíyatuma!

"Thanks this day," together said the fathers and their people, as they looked upon the plants before them, then at the stranger people. "Verily, ye are our elder brothers, and as children and sisters, yea as our very mothers, will we cherish thy maidens and the substance of their flesh!"

"Yea," replied these other Seed people, "eating thereof, ye shall become in very truth our younger brothers! For even as the father hath said, these be the product of our hands joined with thine in labor,

and of our hearts joined with thine in sacred thought." Then the ancient of the People of Dew stood in place of Paíyatuma, and spake:

Behold the fulfilment of work ye began!
Ears fully gifted with fruitage of kernels
By the warmth of our maidens
In embrace with your Rain youth;
The seed of their persons
All wrapped in soft garments
And draped with the hair
Of their full generation;
All proportioned and formed
By the touch of the Dew God;
Made complete and mature
By the touch of the Time God;
Ripened fully, as food,
By the touch of the Fire God!
First, yet last of them all
Is the plant of the Middle—
With its seven-fold kernels
And hues of the embers—
Is the corn of all regions,
The Í-to-pa-nah-na-kwe!
Yet the earliest quickened
By the eldest Corn maiden,
Is the corn of the North land;
Made yellow by flame-light,—
The hue of the North sky
Seen in winter or gloaming,—
Is the strong 'Hlúp-tsi-kwa-kwe!
Then the corn of the West land
By the next sister quickened,—
Made blue by the smoke-light,—
Is hued like the ocean
Or shadows of evening,—
The rich 'Hlí-a-kwa-kwe!
Next, the corn of the South land,
By the third sister quickened,
Is red, like the flowers
And fruitage of summer—
Made so by the brand-light—
Is the sweet Shí-k'ya-na-kwe!
Next the corn of the East land
The fourth sister quickened,
Is white, like the milk
Which we drink in the morning
Of life; like the light
Of the dawning each morning—
Made so by full fire-light—
Is the pure K'ó-ha-kwa-kwe!
Next, the corn of the Zenith,
The fifth sister quickened,
Is streaked like the sky
With the clouds and the rainbow—
Made so by the spark-light—
Is the hard K'ú-chu-a-kwe!

And next is the corn of
The dark Lower regions
The sixth sister quickened;
Is black like the depth of
The earth it emerged from—
Made so by the heat-light—
Is the soft Kwí-ni-kwa-kwe!
Last, as first, is the Mid-most,
Quickened first by the seventh
Of all the Corn maidens;
Bearing grains of each color—
Made so by the embers—
And seed of them all,
Hence, the Tém-'hla-nah-na-k'ya,
Í-to-pa-nah-na-kwe!

Thus, of the substance of all flesh is the seed of seeds, Corn! And suited to all peoples and places; yet we, brothers younger are with ye, favored in the light, in that together we are its priests and keepers. Let us therefore love it and cherish it, as we cherish and love our women; and it shall be the giver of milk to the youthful and of flesh to the aged, as our women folk are the givers of life to our youth and the sustainers of life in our age; for of the mother-milk of the Beloved Maidens it is filled, and of their flesh the substance. Eating thereof, thy youth shall grow strong and handsome, thy maidens beautiful and fruitful, even as are themselves, the Beloved Maidens, our mothers and thine!"

"Be it well!" said the fathers. "Brothers younger to ye, let us indeed be, and let us, therefore, clasp the warm hands of brothers elder and brothers younger, making the words of the Father of Dawn true, in truth!"

Then the ancient of the People of the Dew replied:

It is well, brothers younger!
Dwell in peace by our firesides.
Guard the seed of our maidens,
Each kind as ye see it,
Apart from the others.
And by lovingly toiling,
As by toiling and loving,
Men win the full favor
And hearts of their maidens,
So, from year unto year
Shall ye win by your watching,
And power of beseeching,
And care for the corn-flesh,
The favor and plenish
Of our seven Corn maidens.
They shall dance for the increase
And strength of the corn-seed,
Of each grain, making many—
Each grain that ye nourish
With new soil and water!
For long, ere ye found us,

We afar sought for water,
Drinking dew from our father,
Like deer, on the mountains!
And for long ere ye found us
Ye wandered in hunger,
Seeking seed of the grasses,
Like birds on the mesas.
Thus, 'tis well, brothers younger,
That ye dwell by our firesides!

Thus, happily were our fathers joined to the People of the Dew, and the many houses on the hills were now builded together in the plain where first grew the corn plants abundantly; being prepared year after year by the beautiful custom of the ever young maidens, and attended faithfully by the labors of the people and the vigils of their fathers.

THE RENEWAL OF THE SEARCH FOR THE MIDDLE.

When men had almost forgotten the seeking of the Middle, the earth trembled anew, and the shells sounded warning. Murmuring sore when the Twain Beloved came and called them again, yet carrying whatsoever they could with them (more preciously than all things else save their little ones, the seed of corn!), they and the people they had dwelt with journeyed on, seeking safety. For now, their kin were mingled; thus, their children were one people. Wheresoever they rested, they builded them great houses of stone, all together, as may still be seen. And in the plains ever they built them bowers for the watching of the renewal and growth of the seeds of the corn. Therefore, they never hungered whether journeying anon or sitting still.

THE CHOOSING OF SEEKERS FOR SIGNS OF THE MIDDLE.

Now with much of journeying the people came to grow weary with ever seeking for the Middle all together, along a single way, insomuch that increasingly they murmured whenever they were summoned and must needs be leaving their homes and accustomed ranging-places. And so they fell to devising amongst themselves, until at last it seemed good to them to be sending messengers forth in one direction and another, the sooner to feel out the better way, and find signs of the Middle: as, by dividing, a company of hunters the sooner find trace of their quarry.

Now there was a priest of the people named Kâ'wimosa (of the Kâ'kâ master-maker or source), thus named because he it was who was to establish, all unwittingly, the most potent and good sacred dance (myth-drama or Kâ'kâ) as happened after this wise:

He had four sons (some say more) and a daughter. And his eldest son was named K·yäk'la, which signifies, it is said, "Whensoever;" for he was wiser of words and the understanding thereof than all others, having listened to the councils of men with all beings, since

ever the inner beginning! So, when it was asked who of the precious ones (children of priest-fathers and priest-mothers) should journey northward, seeking to learn the distance thitherward to the great embracing waters, that the Middle might be the better surmised; nor said the Twain aught, as we say naught, to little children weary of a way that must, weary or nay, be accomplished! When this was asked, Kâ'wimosa, the priest, bethought himself of his wise eldest son and said, "Here is he!" Thus K'yäk'lu was summoned, and made ready with sacrifice presentations from all the priests to all the surpassing-ones for the great journey; and he departed.

Long the people waited. But at last it was said, "Lost is our K'yäk'lu! For wise of words was he, but not wise of ways!"

And the fathers, mourning, again called a council. Again, when it was inquired, Kâ'wimosa the priest, bethought him, and cried, "Here!" and again were made ready duly and sent forth messengers, this time southward, the next younger brothers of K'yäk'lu (Ánahohoátchi); for, said the father, they will guide one another if ye send twain. And of these, also, much is told in other talks of our ancient speech; but then, they too, lingered by the way.

Once more a council was called, and again, when it was inquired, Kâ'wimosa cried, "Here!" and this time the youngest son, who was named Síweluhsiwa, because he was a long-haired youth of great beauty; and the daughter, who was named Síwiluhsitsa, because she was a long-tressed maiden of beautiful person; they also were summoned and made ready duly and sent eastward.

THE CHANGE-MAKING SIN OF THE BROTHER AND SISTER

Far they journeyed, and as the day quickened they saw before them a distant high mountain.

> Let us hasten, O, sister, my sister!
> Thou art weary with travel, my sister;
> We will rest in the shade of yon mountain.
> I will build you a bower of cedar,
> And seek in the cliffs for game-creatures;
> And you shall rest happily, sister.

Thus spake he, for he loved his sister and her beauty. (Nay, but she was soft and beautiful!)

And so, they hastened. When they reached the mountain, Síweluhsiwa built a bower of cedar branches under the shade of a tree. Then he went forth to seek game. When, having captured some, he returned, his sister was sleeping in the bower; so he stepped softly, that he might not disturb her—for he loved his sister, and gently he sat himself down before her and leaned his chin on his hand to watch her. The wind softly blew to and fro, and she slept on; her white cotton mantle and garments were made light for the journey, and thus the wind played with them as it listed over her prostrate form. As the

brother gazed at her, he became crazed with love of her, greater than that of a brother's, greater than that of kin men for kin! * * *

Crazed was he, yea, and bideless of act; and the sister, thus awakened, fled from him in loud affright, and then, in shame and hot anger turning, upbraided him fiercely. Wondrous beings were they, more than it is the lot of mere men in these days to be, for they were the children of Kâ'wimosa the priest, and a priestess-mother in the times of creation and newness. And so, like to the surpassing ones, they were *'hlímnawiho*, or changeable-by-will inclined; yea, and all things were *k'yaíyuna* or formative, when the world was new! Lo, now! Therefore, as she upbraided him, her eyes grew great and glaring and her face spotted and drawn. And he, as he heard and saw her, grew dazed, and stood senseless before her, his head bowed, his eyes red and swollen, his brow bent and burning.

"Thou shameless of men!" cried the maiden. "Know that thou shalt return to thy people never; nay, nor will I! Lo! I will make by mine the power a deep water dividing this mountain! Alone on one side shalt thou dwell, alone on the other dwell I! I will draw a line, and make a swift water between the day-land and the night-land, between all our people and us!" She stamped with her sandal as she spake, and deep was the mark thereof; for the mountain was hollow and resounding. Then she ran headlong down to the westward end of the mountain and drew her foot along the sands from the south to the northward, and deep was the gully she made. And the brother, seeing her flee, ran after her calling hoarsely. But now, as he neared her, he stopped and stared; and forthwith grew crazed more than ever; but with anguish and fright this time, at her rage and distortion. As she turned again back, he threw his arms aloft, and beat his head and temples and tore away his hair and garments and clutched his eyes and mouth wildly, until great welts and knobs stood out on his head; his eyes puffed and goggled, his lips blubbered and puckered; tears and sweat with wet blood bedrenched his whole person, and he cast himself headlong and rolled in the dust, until coated with the dun earth of that plain. And when he staggered to his feet, the red soil adhered to him as skin cleaves to flesh, and his ugliness hardened.

The maiden stared in wild terror at what she had wrought! And now she, too, was filled with anguish and shrieked aloud, tossing her arms and rushing hither and thither, and so great was her grief and despair that her hair all whitened. Lo! now she lamented plaintively and pitied her brother, for she thought—woman-like!—"But he loved me!" So, she tenderly yearned for him now, and ran toward him. Again he looked at her, for he was crazed, and when he saw her close at hand, so strange looking and ugly, he laughed aloud, and coarsely, but anon stood still, with his hands clasped in front of him and his head bowed before him, dazed! When he laughed, she too laughed; when he was silent and bowed, she cried and besought him. Thus it

was with them ever after in those days. They talked loudly to each other; they laughed or they cried. Now they were like silly children, playing on the ground; anon they were wise as the priests and high beings, and harangued as parents to children and leaders to people.

The marks in the mountain and sands sank farther and farther; for much the earth shuddered as was wont in those days. And thus the mountain was sundered in twain and waters welled up in the midway. The furrow in the sands ran deeper and deeper and swifter and swifter with gathering water. Into the nether mountain the pair fled—not apart—but together, distraught. Ceaselessly echoed their gibberish and cries across the wide water and from one mountain side to the other. Thenceforth, together they dwelt in the caves of the place they had chosen, forgetful of the faces of men and recking naught of their own ugly condition!

THE BIRTH OF THE OLD-ONES OR ANCIENTS OF THE KA'KÂ.

In time there were born to these twain, twelve children. Nay, neither man-children nor woman-children they! For look now! The first, was a woman in fulness of contour, but a man in stature and brawn. From the mingling of too much seed in one kind, comes the two-fold one kind, *'hlâhmon*, being man and woman combined—even as from a kernel of corn with two hearts, ripens an ear that is neither one kind nor the other, but both! Yet not all ill was this first child, because she was born of love—what though crazed!—ere her parents were changed; thus she partook not of their distortions. Not so with her brothers; in semblance of males, yet like boys, the fruit of sex was not in them! For the fruit of mere lust comes to naught, even as corn, self-sown out of season, ripens not. For their parents, being changed to hideousness, abode together witlessly and consorted idly or in passion not quickened of favor to the eye or the heart. And lo! like to their father were his later children, but varied as his moods; for then, as now, what the mother looked most on while withholding them, thus wise were they formed as clay by the thought of the potter; wherefore we cherish our matrons and reveal not to them the evil dramas neither the slaughtered nor hamstrung game lest their children be weakly or go maimed. Thus they were strapping louts, but dun-colored and marked with the welts of their father. Silly were they, yet wise as the gods and high priests; for as simpletons and the crazed speak from the things seen of the instant, uttering belike wise words and prophecy, so spake they, and became the attendants and fosterers, yet the sages and interpreters, of the ancient of dance-dramas or the Kâ'kâ.

Named are they, not with the names of men, but with names of mismeaning, for there is Pékwina, Priest-speaker of the Sun. Meditative is he, even in the quick of day, after the fashion of his father when shamed, saying little save rarely, and then as irrelevantly as the veriest child or dotard.

Then there is Pí'hlan Shíwani (Bow Priest-warrior). So cowardly he that he dodges behind ladders, thinking them trees no doubt, and lags after all the others, whenever frightened, even at a fluttering leaf or a crippled spider, and looks in every direction but the straight one, whenever danger threatens!

There is Éshotsi (the Bat) who can see better in the sunlight than any of them, but would maim himself in a shadow, and will avoid a hole in the ground as a woman would a dark place, even were it no bigger than a beetle burrow.

Also there is Muíyapona (Wearer of the Eyelets of Invisibility). He has horns like the catfish, and is knobbed like a bludgeon-squash. But he never by any chance disappears, even when he hides his head behind a ladder rung or turkey quill, yet thinks himself quite out of sight. And he sports with his countenance as though it were as smooth as a damsel's.

There is Pótsoki (the Pouter), who does little but laugh and look bland, for grin he can not; and his younger brother, Ná'hläshi (Aged Buck), who is the biggest of them all, and what with having grieved and nearly rubbed his eyes out (when his younger brother was captured and carried off by the K'yámak'ya-kwe or Snail Kâ'kâ of the South), looks as ancient as a horned toad; yet he is as frisky as a fawn, and giggles like a girl; yea, and bawls as lustily as a small boy playing games.

The next brother, Ítseposa (the Glum or Aggrieved), mourned also for his nearest brother, who was stolen by the Kâ'kâ, too, until his eyes were dry utterly and his chin chapped to protrusion; but nathless he is lively and cheerful and ever as ready indeed as the most complaisant of beings.

K'yä'lutsi (the Suckling) and Tsa'hläshi (Old-youth), the youngest, are the most wilfully important of the nine, always advising others and strutting like a young priest in his first dance, or like unto the youthful warrior made too aged-thinking and self-notioned with early honoring.

And while the father stands dazed, with his head bowed and his hands clasped before him or like to broken bows hanging by his sides, these children romp and play (as he and his sister did when turned childish), and verily are like to idiots, or to dotards and crones turned young again, inconstant as laughter, startled to new thought by every flitting thing around them; but, in the presence of the Kâ'kâ of old, they are grave what though so uncouth. And they are the oracles of all olden sayings of deep meanings; wherefore they are called the Kâ'yemashi (Husbandmen of the Kâ'kâ or sacred drama-dance); and they are spoken of, even by the Fathers of the People, as the Á'hläshi Tséwashi (Sages of the Ancients). And most precious in the sight of the beings and of men are they! But for their birth and the manner thereof, it is said that all had been different; for from it many things

came to be as they are, alike for men and gods and even the souls of the dead!

THE RENEWAL OF THE GREAT JOURNEY, AND THE SUNDERING OF THE TRIBES OF MEN.

There came a time when the people for whom Siweluhsiwa and Siwiluhsitsa had gone to seek the way, could tarry no longer awaiting them; for, hearing the earth rumble, the Twain Beloved and their Warrior-leaders of the Knife summoned the tribes forth to journey again. Now in these days the people had grown so vast of number that no longer could they journey together; but in great companies they traveled, like herds of bison severed when too numerous for the grass of a single plain. The Bearers of the Ice-wands and the Ancient Brotherhood of the Knife led the clans of the Bear, the Crane, the Grouse and others of the People of Winter (yea and in small part others too), through the northernmost valleys, carrying ever in their midst the precious *múetone.* The Fathers of the People, Keepers of the seed, and the Ancient Brotherhood of Priests led the clans of the Macaw and other Summer people (and in part others still) through the middle valleys, carrying ever in their midst the precious *k'áetone.* They, being deliberate and wise, sought rather in the pathway between the northward and the southward for the place of the Middle.

The Seed-fathers of the Seed-kin, the Keepers of Fire, and the Ancient Brotherhood of Paíyatuma (Néwe-kwe) led the All-seed clans, the Sun, Badger and other Summer people (not of the Midmost), through the southern valleys, carrying ever in their midst the precious *chúetone.*

Leading them all, whether through the northern ways, through the middle ways, or through the southern ways, now here, now there, were the Two Beloved ones, and with them their Warriors of the Knife.

Now although those who went by the northern way were called the Bear and Crane father-people, yet with them went some of all the clans, as the Parrot-macaws of the Middle, and the Yellow-corn ones of the Southern people.

And although the People of the Middle way were called the Macaw father-people, yet with them went Bear and Crane people of the north, nevertheless, (a few) and Seed people of the south, also (a few) those of the White Corn.

And although the people of the southern way were called the All-seed father-people, yet with them went a few of both the northern and the middle ways. And this was well! That even though any one of these bands might hap to be divided through wildness of the way or stress of war, they nathless might retain, each of them, the seed of all the kin-lines. Moreover, this of itself speedily came to be, through the mingling of the clans from one to another in the strands of marriage.

And although thus apart the peoples journeyed, descending from the westward the valleys toward north and toward south, like gather-

ing streams from a wide rain-storm, yet also like rain-streams gathering in some great river or lagoon, so they came together and thus abode in seasons of rest. Strong and impetuous, the Bear kindred on the one hand were the first to move and farthest to journey; on the other hand the Seed kindred led the way; whereas, the heart of them all of the Macaw kindred, deliberately (as was their custom) pursued the middle course of the Sun-father.

In such order, then, they came, in time, within sight of the great divided mountain of the Kâ'yemäshi. Seeing smoke and mist rising therefrom, they all, one after another, hastened thither. The Bear peoples were first to approach, and great was their dismay when, on descending into the plain, they beheld a broad river, flowing, not as other waters were wont to flow in that land, from east to west, but straight across their pathway, from toward the south, northward. And lo! on the farther side were the mysterious mountains they sought, but between them rolled swiftly these wide turbid waters, red with the soil of those plains.

THE ORIGIN OF DEATH BY DYING, AND THE ABODE OF SOULS AND THE KÂ'KÂ.

Not for long did the impetuous fathers of the Bear and Crane deliberate. Nay! Straightway they strode into the stream and feeling forth with their feet that it e'en might be forded—for so red were its waters that no footing could be seen through them,—they led the way across; yet great was their fearfulness withal; for, full soon, as they watched the water moving under their very eyes, strange chills did pervade them, as though they were themselves changing in being to creatures moving and having being in the waters; even as still may be felt in the giddiness which besets those who, in the midst of troubled or passing waters, gaze long into them. Nathless, they won their way steadfastly to the farther shore. But the poor women who, following closely with the little children on their backs, were more *áya'we* (tender, susceptible), became witlessly crazed with these dread fear-feelings of the waters, wherefore, the little ones to whom they clung but the more closely, being *k'yaíyuna* and all unripe, were instantly changed by the terror. They turned cold, then colder; they grew scaly, fuller webbed and sharp clawed of hands and feet, longer of tail too, as if for swimming and guidance in unquiet waters. Lo! They felt of a sudden to the mothers that bore them, as the feel of dead things; and, wriggling, scratched their bare shoulders until, shrieking wildly, these mothers let go all hold on them and were even fain to shake them off—fleeing from them in terror. Thus, multitudes of them fell into the swift waters, wailing shrilly and plaintively, as even still it may be said they are heard to cry at night time in those lone waters. For, no sooner did they fall below the surges than they floated and swam away, still crying—changed verily, now, even in bodily form; for, according to

their several totems, some became like to the lizard (*mík'yaiya'hli*), chameleon (*sémaiyak'ya*), and newt (*téwashi*); others like to the frog (*ták'aiyuna*), toad (*ták'ya*), and turtle (*étâwa*). But their souls (*top'hâ'ina*, 'other-being or in-being'), what with the sense of falling, still falling, sank down through the waters, as water itself, being started, sinks down through the sands into the depths below. There, under the lagoon of the hollow mountain where it was erstwhile cleft in twain by the angry maiden-sister Síwiluhsitsa as before told, dwelt, in their seasons, the soul-beings of ancient men of war and violent death. There were the towns for the 'finished' or dead, Hápanawan or the Abode of Ghosts; there also, the great pueblo (city) of the Kâ'kâ, Kâ'hluëlawan, the town of many towns wherein stood forever the great assembly house of ghosts, Áhapaáwa Kíwitsinan'hlana, the kiva which contains the six great chambers in the midst of which sit, at times of gathering in council, the god-priests of all the Kâ'kâ exercising the newly dead in the Kâ'k'okshi or dance of good, and receiving from them the offerings and messages of mortal men to the immortal ones.

Now, when the little ones sank, still sank, seeing naught, the lights of the spirit dancers began to break upon them, and they became, as be the ancients, *'hlímna*, and were numbered with them. And so, being received into the midst of the undying ancients, lo! these little ones thus made the way of dying and the path of the dead; for whither they led, in that olden time, others, fain to seek them (insomuch that they died), followed; and yet others followed these; and so it has continued to be even unto this day.

But the mothers, still crying, knew not this—knew not that their children had returned unharmed into the world whence even themselves had come and whither they too needs now must go, constrained thither by the yearnings of their own hearts in the time of mourning. Loudly, still, they wailed, on the farther shore of the river.

THE LOSS OF THE GREAT SOUTHERN CLANS.

The Seed clans arrived, and strove to cross the waters, but as it had chanced to the others so befel it all dismally with them, until loud became the commotion and multitudes of those behind, nearing—even many of the Midmost clans—turned and fled afar southward along the bank, seeking a better crossing; fled so far that they were lost to sight speedily and strayed never to return!

Nay, they became the fathers and mothers of our Lost Others—lost ever since that time.

THE SAVING OF THE FATHER-CLANS.

Lo! as the people were crying aloud and tossing their hands aloft and the many—so many!—were fleeing away, came the Beloved Twain, and

with voices strong-sounding and sure, bade them cease from their clamor and terror, saying—

Look now, ye faithless and witless!
The mothers who love not their offspring
And cherish them not through all danger,
Must lose them anon, as the woodbird,
Who sits not her nest, doth her broodlings!
Fear not, but cleave fast to your children
Though they strange-turn and frightful of seeming!
'Tis the magic of water, and wildness
Of heart, and will pass (as men's laughter
Doth pass when the joy-thought is sobered),
As ye win your way forth from the waters.

Thus spake they, and continued speaking; whereupon the people who were yet left, took heart, even the women, and stayed their thoughts, clinging stoutly to their little ones as they fared through the waters, what though the terror and hurt was sore. Thus passed they all safely over, and—even as had been said—as they won their way up from the waters and sat them down to rest on the farther shore below the mountains, lo! the little ones grew warm and right again. But never were the thoughts of womenkind beguiled wholly from that harrowing journey. Wherefore they be timid of deep places, startled (as is the voice of a vessel by any shrillness of sound) and witless-driven by the sight of reptile-creatures. Lo! and so their anxieties are like to press themselves on the unripe and forming children of their bowels. Wherefore, also, we guard their eyes from all weird-seeming things when they be with child.

THE AWAITING OF THE LOST CLANS.

Now, when the people were rested and the children righted, they arose and journeyed into the plain to the east of the two mountains and the great water between them. Thence they turned them northward to the sunrise slopes of the uppermost of the mountains. There they encamped, mourning for their lost children and awaiting the coming, perchance, of those who had fled away.

THE STRAYING OF K'YÄK'LU, AND HIS PLAINT TO THE WATER-FOWL.

Ataht! And all this time K'yäk'lu, the all-hearing and wise of speech, all alone had been journeying afar in the north land of cold and white desolateness. Lost was he, for lo! all the world he wandered in now was disguised in the snow that lies spread forth there forever. Cold was he—so cold that his face became wan, and white from the frozen mists of his own breathing withal, white as become all creatures who bide there. So cold at night and dreary of heart was he, so lost by day and blinded by light was he, that he wept, continually wept and cried aloud until the tears coursing down his cheeks stained them with falling lines along the wrinkles thereof (as may be seen on his face

to this day when in due season he reappears), and he died of heart and thence became transformed (*i'hlimnakna*) lastingly as are the gods. Yea, and his lips became splayed with continual calling, and his voice grew shrill and dry-sounding, like to the voices of far-flying water-fowl. As he cried, wandering all blindly hither and thither, these, water-birds, hearing, flocked around him in numbers and curiously peered at him, turning their heads from side to side and ever approaching nearer, all the while calling one to another.

Behold! when he heard them calling, their meanings were plain to him, wise as he was of all speeches! Yet still he lamented aloud, for none told him the way to his country and people.

HOW THE DUCK, HEARING, WAS FAIN TO GUIDE K'YÄK'LU.

Now, when the Duck heard his cry, lo! it was so like to her own that she came closer by than any, answering loudly. And when they were thus come near to each other, much related appeared they, strange as that may seem. Forasmuch as he was of all times the listener and speaker, and therein wisest of all men, so was she of all regions the traveler and searcher, knowing all ways, whether above or below the waters, whether in the north, the west, the south, or the east, and therein was the most knowing of all creatures. Thus the wisdom (*yú-yananak'ya*) of the one comprehended (*aíyuhetok'ya*) the knowledge (*ánikwanak'ya*) of the other, and K'yäk'lu in the midst of his lamentations besought counsel and guidance, crying—

Ha-na-ha! ha-na-ha! a-hah-hua!
O, grandmother! Where am I straying
So far from my country and people?
All speeches I know, of my sitting
In councils of men and the beings,
Since first in the depths they had being!
But of far ways, alas! I am kenless!
Ha-na-ha! ha-na-ha! a-hah-hua!
The mountains are white, and the valleys;
All plains are like others in whiteness;
And even the light of our father
The Sun, as he rises and passes,
Makes all ways more hidden of whiteness!
For in brightness my eyes see but darkness—
And in darkness all ways are bewildered!
Ha-na-ha! ha-na-ha! a-hah-hua!
In the winds, lo! I hear the directions;
But the winds speak the ways of *all* regions,
Of the north and the west and the southward,
Of the east and of upward and downward,
They tell not the way to the Middle!
They tell not the way to my people!
Ha-na-ha! ha-na-ha! a-hah-hua!

"Hold, my child, my father," said the Duck. "Think no longer sad thoughts. Though thou be blind, yet thou *hearest* all as I *see* all. Give

me, therefore, tinkling shells from thy girdle and place them on my neck and in my beak. Thus may I guide thee with my seeing if so be thou by thy hearing grasp and hold firmly my trail. For look, now! Thy country and the way thither well I know, for I go that way each year leading the wild goose and the crane, who flee thither as winter follows."

And so the K'yäk'lu placed his talking shells on the neck of the Duck, and in her beak placed the singing shells, which ever in his speakings and listenings K'yäk'lu had been wont to wear at his girdle; and albeit painfully and lamely, yet he did follow the sound she made with these shells, perching lightly on his searching outstretched hand, and did all too slowly follow her swift flight from place to place wherein she, anon, going forth would await him and urge him, ducking her head that the shells might call loudly, and dipping her beak that they might summon his ears as the hand summons the eyes. By and by they came to the country of thick rains and mists on the borders of the Snow World, and passed from water to water, until at last, lo! wider waters lay in their way. In vain the Duck called and jingled her shells from over the midst of them, K'yäk'lu could not follow. All maimed was he; nor could he swim or fly as could the Duck.

HOW THE RAINBOW-WORM BORE K'YÄK'LU TO THE PLAIN OF KÂ'HLUĖLANE.

Now the Rainbow-worm was near, in that land of mists and waters. And when he heard the sacred sounds of the shells he listened. "Ha! these be my grandchildren, and precious be they, for they call one to the other with shells of the great world-encircling waters," said he; and so, with one measure of his length, he placed himself nigh them, saying—

Why mourn ye grandchildren, why mourn ye?
Give me plumes of the spaces, grandchildren,
That related I be to the regions,
That uplifted I be to the cloud-heights,
That my footsteps be countries and countries;
So I bear ye full swift on my shoulders
To the place of thy people and country.

K'yäk'lu took of his plume-wands the lightest and choicest; and the Duck gave to him her two strong pinion-feathers that he might pendant them therewith, making them far reaching and far-seeing. And the Rainbow arched himself and stooped nigh to them whilst K'yäk'lu, breathing on the plumes, approached him and fastened them to his heart side. And while with bent head, all white and glistening wet, K'yäk'lu said the sacred words, not turning to one side nor to the other, behold! the Rainbow shadow gleamed full brightly on his forehead like a little rainbow, (even as the great sky itself gleams little in a tiny dew-drop) and became painted thereon, and *i'hlimna*.

"Thanks this day!" said the Rainbow. "Mount, now, on my shoulders, grandson!"

The Rainbow unbent himself lower that K'yäk'lu might mount; then he arched himself high amidst the clouds, bearing K'yäk'lu upward as in the breath a mote is borne, and the Duck spread her wings in flight toward the south. Thitherward, like an arrow, the Rainbow-worm straightened himself forward and followed until his face looked into the Lake of the Ancients, the mists whereof were to him breath and substance.

And there in the plain to the north of Kâ'hluëlane, K'yäk'lu descended even ere the sun was fully entered, and while yet it was light, the Rainbow betook himself swiftly back.

But alas! K'yäk'lu was weary and lame. He could not journey farther, but sat himself down to rest and ponder the way.

THE TARRYING OF K'YÄK'LU IN THE PLAIN, AND HIS DISMAY.

Now, as he sat there, all silent, came across the plains the shouts and harangues of the Kâ'yemäshi as they called loudly to one another, telling, like children, of the people who had but then forded the wide river, and passed on to the eastward "with such great ado," said they.

For the children of the Twain knew not yet the people of their parents, nor did their parents tell them aught, save to bid them hide in the mountains; for they willed not that their shame be made known whilst the hearts of their erstwhile people were so sore with anguish.

And as K'yäk'lu, the wonderful hearer, lifted his head and signed to the Duck, forthwith knowing from the talk of the Kâ'yemäshi who they were and what had chanced to their parents, his own brother and sister, and all the evils that had befallen his people by the sin and change-makings of these two. Lo! the strength of his heart wasted as he bowed him down again in the plain, alone, blinded of sight, wearied and lamed, and now from very sadness blinded even of thought withal, now that he learned of the woes which the two, his own brother and sister, had wrought upon all of the people. The Duck, long waiting, at last shook her shells and called to him. He heard not, or hearing gave no heed, but sat, like one bereft of all thinking, lamenting the deeds of his brother and sister and the woes of his people.

HOW THE DUCK FOUND THE LAKE OF THE DEAD AND THE GODS OF THE KÂ'KÂ.

The Duck thereupon fled away toward the mountain whence issued the garrulous talking, and thence beyond, spying water, to the lake in its hollow. There she swam to and fro, this way and that, up and down, loudly quacking and calling. Lo! the lights of the Kíwitsin of the Kâ'kâ began to gleam in the waters, and as she gazed she beheld, rising from them, snout foremost, like one of her own kind, the Sâlamopia of the north, whom the gods of the Kâ'kâ, the noble and surpassing

Páutiwa and the ancient K'yáu'hliwa, had dispatched to bid the Duck dive down and lay before them whatsoever message she might bear. The Duck followed down, down, into the great assembly halls. There she told of the far journeys she had made, of her finding and leading the K'yäk'lu, and how now K'yäk'lu sat blind of eyes, maimed and hearing naught of her calling, in the plain beyond the mountains.

HOW THE GODS OF THE KÂ'KÂ COUNSELLED THE DUCK.

"Yea, him know we well!" replied the gods. "Of our sacred breath breathed his father and his mother when days were new and of us shall be numbered they, when time is full. Lo! therefore because changed violently of his grief and sore hardships whilst yet but *k'yaíyuna*, he hath become *'hlímna*, and yet unchanging, since finished so; yea, and unceasing, as one of ourselves, thus shall he remain. True also is this, of his brother and sister who dwell with their uncouth offspring in the mountain hard by. Go upward, now, and with thy tinkling shells entice these children to the lake shore. Loudly will they talk of the marvel as in their wilder moments they ever talk of anything new to hap. And they will give no peace to the old ones until these come down also to see thee! Thou wearest the sacred shells and strands of K'yäk'lu wherewith he was ever wont to count his talks in other days when days were new to men. When these they see, lo! instant grave will become they and listen to thy words, for they will know the things they watched him wear and coveted when they were still little, all in the days that were new to men. Bid them make forthwith of poles and reeds, a litter, and bear it away, the father of them all with his children (nay not the sister-mother, to sore hurt the love of a brother eldest for a sister youngest, wherefore so pitiably he mourneth even now) to where, in the far plain, K'yäk'lu sits so mourning. Bid them greet him, and bring him hence. They may not enter, but they may point the way and tell him how, fearlessly, to win into our presence, for as one even of ourselves is he become; yea, and they also, save that they stayed themselves for the ages, midway betwixt the living and the dead, by their own rash acts did they stay themselves so, wherefore it is become their office to point the way of the again living to the newly dead, for aye. Tell the grandchild, thy father withal, K'yäk'lu, to mourn not any longer, neither tarry, but to get him straightway hither, that he may learn from us of his people of the meanings of past times, and of how it shall be in times to come."

HOW BY BEHEST OF THE DUCK THE KÂ'YEMÄSHI SOUGHT K'YÄK'LU TO CONVEY HIM TO THE LAKE OF THE DEAD.

Even so did the Duck, as bidden, even so did the Kâ'yemäshi, one and all, as it had been said they would do as the Duck bade them, and

ere the morning came, they with a litter went, singing a quaint and pleasant song, adown the northern plain, bearing their litter. And when they found the K'yäk'lu, lo! he looked upon them in the starlight and wept; but their father, he who had been the glorious Síwe-luhsiwa, his youngest brother, stood over him and chanted the soothing yet sad dirge-rite, and he, too, wept and bowed his head; but presently he lifted his face and, as a gleeful child, his children joining, cajoled the silent K'yäk'lu to sit him down in the great soft litter they did bear for him.

HOW THE KÂ'YEMÄSHI BORE K'YÄK'LU TO THE COUNCIL OF THE GODS.

Then lifting it on their shoulders, they bore it lightly, singing loudly as they went, to the shores of the deep black lake, where gleamed from the middle the lights of the dead.

Uprose at this point, the Sálamopia Tém'hlanahna or of all the six regions, led by the leader of them all and taking K'yäk'lu on their shoulders, they in turn bore him out over the water to the magic ladder of rushes and canes which reared itself high out of the water; and K'yäk'lu, scattering sacred prayer-meal before him, stepped down the way, slowly, like a blind man, descending a skyhole. No sooner had he taken four steps than the ladder lowered into the deep; and lo! his light was instant darkened.

But when the Sálamopia of the regions entered the central sitting place of the Kâ'kâ with K'yäk'lu, Shúlawitsi lifted his brand on high and swinging it, lighted the fires anew, so that K'yäk'lu saw again with fulness of sight and so that they shone on all the gods and soul-beings therein assembled, revealing them. Yea, and through the windows and doorways of all the six chambers encircling, and at each portal, the Sálamopia of the region it pertained and led unto took his station. And Pántiwa, and his warriors the bluehorned Saia'hliawe, and the tall Sháalako-kwe, yea, and all the god-priests of the regions six, those who are told of without omission in the speech of K'yäk'lu and in other speeches of our ancient talk, bade K'yäk'lu welcome, saying, "Comest thou, son?" "Yea," he replied. "Verily then," said Pántiwa—

Sit thee down with us,
That of much we may tell thee,
For far thou hast wandered
And changed art become.
As a woman with children
Is loved for her power
Of keeping unbroken
The life-line of kinsfolk,
So shalt thou, tireless hearer,
Of all sounds with meaning,
Be cherished amongst us

And worshipped of mortals
For keeping unbroken
The Tale of Creation,
Yea, all we shall tell thee
Of past days and future.

So said Páutiwa, cloud-sender and sun-priest of souls, and his brothers younger of the regions all, joined in so saying.

Then K'yäk'lu sat him down and bowed his head, and calling to the Duck, who had guided him, stretched forth his hand and upon it she settled, as upon a wave-crest or a wood bough.

THE COUNCIL OF THE KÂ'KÂ, AND THE INSTRUCTION OF K'YÄK'LU BY THE GODS.

The gods sent forth their runners, the Sálamopia and the timid, fleet-footed Héhea, to summon all beings, and then, gathering themselves in a sacred song-circle, called in from the several chambers dancers in semblance of the Kâ'kokshi, or Dance of Good. And with these came, behold! the little ones who had sunk beneath the waters, well and beautiful and all seeming wonderfully clad in cotton mantles and precious neck jewels. And these played, sad only with the sadness of their mothers, but resting therefrom when in dreams, above, these rested.

And when the dancers paused, the gods turned to K'yäk'lu and said: "Lo! we begin, given thou be ready."

And K'yäk'lu said: "It is well; I am ready; yea, even my heart listeneth," and in cadence to their speech following, he moved the Duck with her tinkling, talking shells, as a master of song moves his baton, or a dancer his rattle, and in solemn, ceaseless tone, as in singing yet with speech more steady, the gods, one by one, told to K'yäk'lu the things each best knew, whereof he so wondrously speaks when come amongst us for the welfare of our little children, bringing them the sacred breath of the Kâ'kâ itself, and to their elders these same speeches of the gods.

When, after long time, they had done, they further charged him with a message of comfort to the mourning mothers, and with commandments and instructions to men and the beings.

Then they brought forth the sacred cigarette, and the master priest-gods smoked in relationship with K'yäk'lu to all the six regions, and, rising, he was led in turn to the portal of each chamber, first to the northern, then to the western, southern, eastern, upper, and lower, and he placed his fingers on the sill of each, that in aftertimes he should know, though but dim of sight, or in the dark, the places of worship (which men built then but poorly) from others, and in such alone, and to chosen few who hold the rites of the Kâ'kâ, should therein tell and do the customs and words of the gods and tell of other such like precious ancient things.

Then the Sá'lamopia lifted the ladder and guided upward K'yäk'lu and the Duck, showing them safely to the shore of the lake. When

the old ones (Kâ'yemäshi) heard the shells of the Duck tinkling, forth they came, bringing their litter and singing boisterously, for much they loved K'yäk'lu as the light of the rising sun fell upon him, as a raven loves bright shells or chips of glistening stone.

THE INSTRUCTION OF THE KÂ'YEMÄSHI BY K'YÄK'LU.

And when they had come to the side of K'yäk'lu, instant they became grave, for he bade them hearken to the words of the gods, and their instructions.

"Ye shall attend me, for know that ye are to be the guardians of the Kâ'kâ and tellers of its meanings, and givers of enjoyment to the children of men, even as ye gave the enjoyment of comfort unto me, when ye sought me in the plain of my sorrows. Ye shall bear me to the people yonder, for I have tidings for them, and instructions the to which ye shall bear witness in aftertimes when I am not by. Ye shall cherish the Kâ'kâ; yea, and all other precious customs, for thereunto as unto life mortal, yet unceasing, became fitted thy father, my brother younger; and thereunto were ye born, ye and thy sister elder, man-woman of the Kâ'kâ, as unto the councils thereof am I become slave yet master. But my sister, thy mother, shall abide by the place she hath made, maintaining it, as woman ever maintaineth the hearth she hath made, all the days of men."

HOW THE KÂ'YEMÄSHI BORE K'YÄK'LU TO HIS PEOPLE.

This said K'yäk'lu as he sat him down on the litter, and obediently the Kâ'yemäshi lifted it upon their shoulders and bore it away, along the trail eastward, down which westward we go after death and fulfilment. And as they journeyed through the plain, calling loudly to one another, the little people of the Marmot villages ran out and stood up, looking at them and calling to one another, which so amused and pleased the Kâ'yemäshi that they became proud of their master and uncle, K'yäk'lu, and sang all the way thereafter of the audience they had at every prairie-dog village, of Marmot youths and Marmot maidens; and thus they were singing gleefully as they neared the camp of the people, insomuch that none were frightened, but all wondered who were those pleasant, strange people coming, and what one of precious consideration guided of the far-journeying Duck they were bearing aloft on their litter. Thus, ever since, they sing, as they bring in K'yäk'lu from the western plain, along the river-trail of the dead, and thus happily and expectantly we await their coming, our little ones wonderingly as did the first men of those days.

THE RETURN OF K'YÄK'LU, AND HIS SACRED INSTRUCTIONS TO THE PEOPLE.

Speedily the fathers of the people recognized their lost K'yäk'lu (led and prompted as they were of the Twain), and preciously they housed

him, as we preciously and secretly receive with the cigarette of relationship a returning relative, and purify him and ourselves ere he speak, that he may not bring evil or we receive it, perchance, with the breath of his strange words.

Thus the fathers of the people did to K'yäk'lu and the ancient ones, receiving them into secret council. And as one who returns famished is not given to eat save sparingly at first of the flour of drink (*ók'yäslu*), so with this only was K'yäk'lu regaled; but his bearers were laden speedily with gifts of food and garments which, forsooth, they would not wear save in disorderly ways. Then K'yäk'lu spake a message of comfort to the mourners, telling them how, below the waters into which their little ones had sunken, they were dwelling in peace amongst the gods, and how all men and mothers would follow them thither in other part in the fulness of each one's time.

And then, holding in his hand the Duck, the guide to his blindness, he spake in measured motion and tone, to the sound of the shells on the neck of the Duck, the words of creation, *K'yäk'lu Mósonan Chïm'-mik'yanak'ya pénane*, and of his wanderings, and the speeches of gods and beings as they had been told him, and the directions of the sacred customs, all did he tell ceaselessly as is still his wont from mid-day to mid-day to each one of the six councils, that no part be forgotten.

Thus did our people first learn of their lost messengers, all save two of them, Ánahoho áchi, and of their lost children in the City of Ghosts; yea, of the spirit beings and man, animal, and of the souls of ancient men dead beforetime; yea, and yet more learned they—that all would gather there even those who had fled away in fear of the waters, in the fulness of time.

THE ENJOINING OF THE K'YÄK'LU ÁMOSI, AND THE DEPARTURE OF K'YÄK'LU AND THE OLD-ONES.

And when K'yäk'lu had done speaking, he and the ancient ones breathed into the nostrils of those who had listened, and into the mouths of four chosen from amongst them (small of stature like as he was) he spat, that their tongues might speak unfailingly the words he had uttered. And these became the K'yäk'lu Ámosi, whose office we still keep amongst us. Then the ancient ones lifted him upon the litter, and loudly joking about their gifts and bidding men call them ever with the Kâ'kâ that they might receive more *háha*, they sang of how the young women and maidens would wait for them as for lovers, bringing them the water of guests to drink, and amid laughter they bore K'yäk'lu back whence they had come, to the mountain and city of the Kâ'kâ (Kâ'-'hluai yálane).

THE COMING OF THE BROTHERS ÁNAHOHO AND THE RUNNERS OF THE KÂ'KÂ.

Now, when they had departed, there came from the west, behold! two strangers seeming, guided by the Sálamopia, and all the fleet runners

of the Kâ'kâ then first seen of men and feared as by children now, for they were fierce and scourged people from their pathways to make room for those they guided. For know that these were the two brothers Ánahoho who had returned to the desolate cities of their people. Therein had they sought in vain for the living in the blackened houses. They even tore down the chimneys and peered in, seeking for their brother K'yäk'lu, and when they found him not they smote their faces and held their noses in grief, and all black as were their hands with soot, lo! thus became their faces, flat and masked with the black hand-mark of dismay, and as they held their faces they cried dismally and long.

THE DISPATCHING OF THE SOULS OF THINGS TO THE SOULS OF THE DEAD.

No sooner did they come into the village of our fathers than they began turning over the things from which the people had fled, and casting them down where the Sálamopia stamped them into the earth or otherwise destroyed them that their likes might go the way of the dead for the dead and the Kâ'kâ. And when the people saw this, they brought forth vessels and baskets and other things without stint, all of which, as though all were chimneys, the Twain Ánahoho took up, and peering into them lifted their faces and cried their dreary mournful cry, casting these things straightway to the ground. Thus to this day they follow their brother, seeking ever, finding never, sending after their brother the souls of men's possessions that all may be well in the after time, in the after time of each age of man.

THE RENEWAL OF THE GREAT JOURNEYING AND OF THE SEARCH FOR THE MIDDLE.

Long sojourned the people in the town on the sunrise slope of the mountain of Kâ'hluelawan, and what though the earth in time began to groan warningly anew, loath were they to leave the place of the Kâ'kâ and the lake of their dead. But the rumbling grew louder apace, and at last the Twain Beloved called, and bade the people arise, and all together—now that their multitudes were in part diminished—follow them eastward, seeking once more the place of the Middle. Not without murmuring among themselves did the people obey; but after they had fared forward a certain distance they came to a place of fair seeming and great promise, so much so, indeed, that it was said, "Let us tarry in this favored spot, for perchance it may be the place of the Middle."

And so they builded for themselves there greater houses than ever they had builded, and more perfect withal, for they were still great and strong in numbers and wittier than of old, albeit yet unperfected as men; and the place wherein they so builded was Hán'hlipíŋk'ya, "The Place of Sacred Stealing," so named in after time for reasons we wot of.

Long did the people abide therein, prosperously; but with waxing ever wiser and stronger their condition changed, so that little suited to it—with their tails and beast clothing—were our wonderful, magical, yet rude, ugly fathers. Being beast-like, they were sore inconvenienced both at home and abroad, in the chase or at war; for now and again they still in their wanderings met older nations of men and man-beings, with whom they needs must strive, so they thought, forsooth, thereby gaining naught save great danger with increase of anger and stubbornness. Thus, not any longer in fear only of the gods and great monsters, but in fear now of the wars they themselves provoked, contending the world with their own kind and with man-beings, changed yet otherwise were they. Of the elders of all their folk-kins the gods therefore called a council.

THE WARNING-SPEECH OF THE GODS, AND THE UNTAILING OF MEN.

"Changed, verily and yet more changed shall ye be, oh our children!" cried the Twain gods in such fashion and voice that none failed of heeding in all that great council:

Men now, shall ye be,
Like the men of first nations,
Like the perfect Corn Maidens;
Walking straight in the pathways
And full in the sunlight;
Clothed in garments, and tailless
(That ye straight sit in council
And stand the more seemly).
And your feet shall be webless,
And hands void of talons,
Yet full-furnished, for fighting.

Then ranged were the clans
In processions like dancers;
First, the fronts of their faces
Were shorn of their forelocks
By the Twain with their weapons,
And fires of the lightning,
That the Sun on his journeys
Might know them, his children,
And warn them of shame.
Again in processions,
Their talons were severed
And webbed fingers slitted;
And again in processions
Their webbed toes were parted
With the knives of the lightnings.
Then sore was the wounding
And loud cried the foolish;
But the Gods bade them "bear it"
That they and their children
"Be fitter as men."

When lastly the people
Were ranged in procession
And their tails were razed sharply,
There were many who cried
(Little heeding the foremost
Who recked now, no longer
The pain they had suffered),
And these, in their folly,
Shrinking farther and farther
Fled away, in their terror,
Crazed, and chattering loudly,
Climbing trees and high places,
And bereft of their senses
Wandered far (seeking safety,
Sleeping ever in tree-tops)
To the south Summer-country.
Seen again by far walkers—
"Long of tail and long handed
Like wizened man-children,
Wild, and noisy of mouthing,
Their kind still abide there,
Eating raw things like creatures—"
Say the words of the ancients.
"Thus wise fared it ever
With those who feared greatly
The words of the fathers,
Yet feared not their warnings!"
Say the words of the ancients.

Thereafter more and more goodly of favor became the people, for they dwelt long in Hán'hlipíŋk'ya, where, lo! that this might be so, their useless parts had in sacred theft been stolen, as it were, from them, and they gained great strength, and in the fulness thereof they sought more often than ever to war with all strangers (whereby they became still more changed in spirit), the which the Two Beloved watched amain, nor said they aught!

But there came a day when the people grew vain and waxed insolent, saying, "Look now, we are perfect of parts and surely have attained to the Middle place or unto one equal thereunto. Go to, let us build greatly and lay up store, nor wearily wander again even though the earth tremble and the Twain bid us forth. Think ye we shall not be strong and defy even the Fearful?" cried the Men of the Knife, the stout warriors of the Twain. But what of all that? This! Even whilst they were wont to speak in this brave fashion the mountains trembled often, and although afar sounding, much did it abate these boastings!

THE ORIGIN OF THE TWIN GODS OF WAR AND OF THE PRIESTHOOD OF THE BOW.

Well aware of this temper of the people, changed also in spirit became the Twain Beloved. "Verily a time hath come," said they, "and this is the time." Forthwith they called the fathers to council

again, as many of them as there were of the Midmost and of all the folk kins, they and the Men of the Knife—brave of mouth yet weak of danger—called they together, and thus spake unto them:

Lo! long have ye dwelt here
At rest from far journeys.
Sooth! ye stronger have waxed,
And like cubs of the puma
Grown lusty, seek living
Apart from your fathers!
Ye have changed, O, ye children!
Ye have changed been, to men!
Whilst far from the Middle,
The world's stable Middle,
Still ye boast to have found it,
And ye think upon warfare!
Nay, proven ye shall be
And it shall be tested!
Thus far have we led ye
In peace, and with counsel
Of wisdom controlled ye.
But we too have changed been,
By wounding our children
With weapons of magic.
Thus, of blood we have tasted the hunger,
Henceforth by the power of war,
And the hazard of omens and chance,
Shall we open the ways for our people
And guide them in search of the Middle!
And our names shall be known as the Twain
Who hold the high places of earth—
Áhaiyuta, the elder and main;
Mátsailema, the younger of birth.
Come forth, ye War-men of the Knife,
Carve plume-wands of death and the spaces,
Bring out the great drum of the regions!
Come forth, master-priest of the north,
Thou first in the kin of the Bear,
Bring out the seed stuff of the hail-tempests!
Come forth, master-priest of the west,
Thou first in the kin of Coyotes,
Bring out the seed stuff of beast-slaying!
Come forth, master-priest of the south,
Thou first in the kin of the Badger,
Bring out the shell trumpets of fire!
Come forth, master-priest of the east,
Thou first in the kin of the Turkey,
Bring out the great crystal of light.
Come forth, master-priest of the high,
Thou first in the kin of the Eagle,
Lay before us the streaked stone of lightning!
Come forth, master-priest of below,
Thou first in the kin of the Serpent,
Lay out the black stone of earth thunder.
Sit aloof, O, ye priests of the Middle,
Ye first in the kin of All People,

Watch well o'er your seed-things and children!
Speak wisely to these our new children;
Henceforth they shall be your first speakers,
And the peace-making shields of your people,
Through wasting the blood of all foemen
And feeding the soil with its substance!
Thus much.

Then the Twain gave directions:

They named the eight days for preparing.
The people returned to their houses,
The priests to their fastings and labors,
The Twain to their high mountain-places.
And when the eight days had been counted
And all had been done as commanded,
Around the deep pool in the valley,
That leads from the walled Hán'hlipiŋk'ya
The sacred seed-contents were gathered.
And full in their midst the great drum jar
Was placed by the summoned clan-fathers.
Then each took his place in the circle,
And the Twain Gods still further instructed
The kin-priests, and knife-bearing warriors.
Soft they chanted the sacred song-measure,
The magic and dread Shómitâk'ya,
And whispered the seven fell names!
Then they painted the round mark of thunder
And the wavering trail of the lightning
Around the great drum, in the middle,
And on the hooped drum-stick of thunder.
And over the drum-head, with prayer-dust
They marked out the cross of the quarters,
As on the cloud-shield they had leveled
Fire-bolts to the four earthly regions.
With black of shell-corpse-scales that glitters,
They painted the eyes of the leaders;
With blood of their own tinged their cheeks;
With pollen of sleep sealed their lips.
With blood of their own thus they painted
The cheeks of the warriors assembled;
With black of shell-corpse-scales that glimmers
They shaded their eyelids and eyebrows,
That their lives might endure through the trial
And their eyes not be blighted by lightning.
And the nostrils of each they did breathe in,
That their own wind might mingle with man-wind,
Give power to men's voices in battle
And strengthen men's wills with endurance.
Then said they to the drummer and singers:

"Lo, now! Ye shall sing our dread song-line.
Like beetles that fall in hot ashes
Ye shall perish, ye singers and drummer.
But lo! in the lightnings and wind-storms
Your beings shall join the beloved.
Your breaths, too, shall strengthen the warrior

And give power to the voice of the warrior,
Bringing peace to the Seed-priests and women.
And ye shall be foremost forever
Of our Chosen, *the Priests of the Bow.*
Lo! The people shall see that we dread not
The coming of fire-blasts and thunder
With our name-fathers, fiercer than any—
The Storm gods of all the six regions:
Hä'hl'tunk'ya, Wind God of the North;
Ŭ-heponolo, Wind of the West;
Óloma, Wind God of the South;
Tsailúhtsanok'ya—of the East;
Saúshuluma, Wind from Above;
Saíshiwani, Blast from Below;
Unáhsinte, Whirlwind of All!
By their breaths and fell power
We shall changed be, in being;
Made black and mis-shapen;
Made stronger with fierceness;
Made swifter with hurling;
Made crafty with turning;
Plunged deep in the waters,
And renewed of their vigor;
Clad anew with their foam-dress!
Yea, the power of the weapons
The Sun-father gave us
And the Foam-mother made us,
That ye be led upward,
Shall multiplied be
In the means of destruction
For the hands of our children,
Ye Priests of the Bow,
That men be kept living!
But to rock, age-enduring,
Grouped in song for our chosen,
O, drummer and singers!
Ye shall changed be forever!
The foot-rests of eagles
And signs of our order!"

The fathers in thought bowed their faces,
  And secretly prayed, in their hearts.
The people who watched them, held breath,
  And covered their mouths with their robes.
In dread of the powers of magic
  And in woe for the doom of their fathers.
The gods, to the right and the left
  Took their stand by the side of the waters,
As erst they had stood by the cloud-shield,
  Their weapons of magic between them,
The plumes of the warriors placed duly
  In lines, to the eastward before them;
The warriors made ready for travel,
  Apart from, but circling around them.
Then the Twain gave the word of beginning!
  The master of words raised his song-staff,

On its shoulder the plume-wand of man-folk;
The drum-master lifted his sound-hoop,
In its circle the symbol of thunder,
On its handle, the red sign of lightning;
Six times did they lift up in silence
The song-staff and hoop of the drum,
Then struck, with the might of their sinews.
The sound shook the valley with thunder
And above and below echoed thunder;
The meal on the drum-head was lifted
And danced as a rain-cloud around them.
Then the water below moved and bubbled,
And mists like a cold breath ascended;
As wind in a vase the song sounded;
Black cloud-steps rose up from the quarters
And darkened the day with their shadows.
When the first name was named by the singers,
The world rocked with earthquake and thunder
And the roar of swift storms in the northland.
Hä'hl'tunk'ya, with dire eyes and staring—
Gleaming yellow as firelight in winter—
And teeth with rage gnashing, and yellow
As shucks of the corn-plant grown aged—
Tumbled down from the north with his hail-balls,
And, mingling with mud the deep water,
In a voice like the sound of a torrent,
Bellowed loud to the Twain and the singers:

"Why call ye, small worms of the waters
And spawn of the earth and four quarters,
Ye disturbers of thought, lacking shame;
Why call ye the words of my name?"
"Thy feet stay with patience, grandfather;
We are small, but we joy in thy fury,
Whence we yearn for thy counsel and spirit;
For we long to smite foes from the pathways
As thou canst the trees from the highlands."
"Being so, it is well," said the ancient.

Lo! the seed-stuff of hail, bound with treasure,
Gleamed with ice from the breath of his answer.

When they named the next name of the song strand,
Úheponolo rolled from the westland
In sand-blasts and dust-clouds like mountains,
And stayed fast their feet with his driftings;
And [etc.].
When they named the third name of the song strand,
Óloma swirled up from the southland
Like a fire draught, and crackled the pool-rim;
And [etc.].
When they named the fourth name of the song strand,
Tsaíluh'tsanok'ya shrieking shrilly,
Shot the mountains and valleys with dawn-frost;
And [etc.].
When they named the fifth name of the song strand,
Saushúlima streamed from the zenith,

And deluged the vale with swift water;
And [etc.].
When they named the sixth name of the song strand,
Saishíwani ripped the earth open;
Ghosts, corpses, and demons of blackness
Writhed forth in hot flames from the chasm,
And hurled the gods into the water!
Black smoke rose and strangled the people,
Who fell, like the stricken of lightning!
It stiffened the drummer and singers
Whose song ceased to sound, when, all weakly,
They named the last name of the song strand—
Nor moved, when replied *Únahsinte*,
Whirling in (twisting trees as the spinner
Twists fiber of yucca), and rescued
The Twain from the hot, surging waters,
Dried the foam in their hair to war-bonnets,
Caught his brothers the Wind Gods in order
And hurled them, each one to his mountain
(In the north, in the west, and the southward;
In the east, and the upper, and under);
And rising, uplifted the smoke-clouds.
Lo! the world was alight with the sunshine,
And bending above was the Rainbow!

But the drummer and singers were sitting,
Lifted up by the power of the ancients;
Close enwrapped in the dust swept around them,
Made stark by the roar of the death-sounds,
Fixed in death by the shock of the lightnings,
Burned hard by the frost-mingled fire-draughts;
Still sat they, their drum in the middle,
As they sit evermore, in that valley.

Lo! dwarfed and hideous-disguised were the two gods Áhaiyuta and Mátsailema, erst Uanamachi Píahkoa or the Beloved Twain who Descended—strong now with the full strength of evil; and armed as warriors of old, with long bows and black stone-tipped arrows of cane-wood in quivers of long-tailed skins of catamounts; whizzing slings, and death-singing slung-stones in fiber-pockets; spears with dart dealing fling-slats, and blood-drinking broad-knives of gray stone in fore-pouches of fur-skin; short face-pulping war-clubs stuck aslant in their girdles, and on their backs targets of cotton close plaited with yucca. Yea, and on their trunks, were casings of scorched rawhide, horn-like in hardness, and on their heads wore they helmets of strength like to the thick neck-hide of male elks, whereof they were fashioned.

Small were they Twain,
Small and misshapen;
Strong were they Twain,
Strong and hard favored;
Enduringly thoughtful were they Twain,
Enduring of will;
Unyieldingly thoughtful were they Twain,
Unyielding of will:

Swiftly thoughtful were they Twain,
Swift of wile;
Heartless minded were they Twain,
Wrathful of heart;
Strong were they of spirit,
Strong were they of breath,
Evil were they and bad,
Evil, both, and bad.

Lo! and of Chance and Fate were they the Masters of fore-deeming; for they carried the word-painted arrows of destiny (*shóliweátsinapa*), like the regions of men, four in number. And they carried the shuttle-cocks of divination (*hápochiwe*), like the regions of men, four in number. And they carried the tubes of hidden things (*íyankolotómawe*), like the regions of men, four in number. And the revealing-balls thereof, (*íyankolote tsemak'ya móliwe*), like the regions of men, four in number. Yea, and they bore with these other things—the feather-bow and plume-arrow of far-finding, tipped with the shell of heart-searching; and the race-sticks of swift journeys and way-winning (*mótikwawe*) two of them, the right and the left, the pursuer and the pursued of men in contention. All of these things wherewith to divine men's chance, and play games of hazard, wagering the fate of whole nations in mere pastime, had they with them.

Twain Children of terror and magic were they, and when they called with the voice of destruction the smitten warriors of these Twain Children stirred and uprose, breathing battle-cries as echoes answer cries in deep canyons, and swiftly they roused those who still lived, of the deep-slumbering people.

Some, like the drummer and singers, had stiffened been, to stone; nor heard they the shrill death-cries than which in the night time naught is more dread-thrilling. Nay, years come and go, and sitting or lying where stricken the hunter sees them still. But others had endured in flesh and they were awakened. Then the priests led them back to rebuild their wrecked houses, and the Twain again assembling their warriors, said to them—

Know ye our chosen:
Lo! not long shall we tarry;
Prepare as for journeys;
Season wood for thy bow-strings
And face-breaking war-clubs;
Plait shields like to our shields,
And fashion strong garments—
For in such hard apparel
Shall consist thy adornment;
Attend to our teaching
At night, in close places,
For in such shall consist
Thy strength of straight thinking
In all tangled places!

Night after night the war-drum sounded, deep in the caves of the valley, and with it the tones of the words—all potent—forbidden and

secret which the Twain gods were teaching unto the first Priests of the Bow.

THE DOWNFALL OF HAN'ʻHLIPIŊKʻYA, AND THE SEARCH ANEW FOR THE MIDDLE.

Thus wise were the Priests of the Bow established by teaching of the Twain, whose breaths of destruction each one of them breathed in due part; whom none might gainsay; nay, not even the fathers whose speakers they were, and with whom none might contend; nay, not even sorcerers, whose scourgers they were—nor yet the Fearful!

And so, when on a dark night thereafter the world groaned and the shells sounded warning, all together the Twain and these their new warriors sought the priest-fathers of the people, bidding them take in hand for carrying, their tabernacles of precious possessions. And swiftly and sternly too they wakened all sleepers, old ones and young, and those who obeyed them were gathered in clan-lines and led off to safety, for Áhaiyuta, the elder, and his warriors journeyed before them, and Mátsailema, the younger, and his warriors followed behind—shields of the people, makers and destroyers of pathways! But those who loved sleeping or who murmured like children were left to their evil; they were choked by the black fumes, or buried in the walls of their houses, which fell when presently the earth heaved with dire fumes, fire and thunder. Their bones are still digged by the gopher and marmot.

Thus, from country to country journeyed the people, their fathers the priests and the keepers of the mysteries, with the women and children in their midst, while before them, from valley to valley, the Bow-priests swept danger away.

THE WARS WITH THE BLACK PEOPLE OF THE HIGH BUILDINGS AND WITH THE ANCIENT WOMAN OF THE KʻYA'KWEINA AND OTHER KÂ'KÂKWE.

At last the people neared, in the midst of plains to the eastward, great towns built in the heights (*héshotayálawa*). But in these times the thoughts of their warriors were always those of the eagle or mountain-lion or other fierce creatures of prey. Of those they met it was "Lo, now! If I can but seize him and utterly overthrow him and eat of his substance, feeding therewith also my kind!" Thus, only, thought they.

Great were the fields and possessions of this people, for they knew how to command and carry the waters, bringing new soil; and this too without hail or rain. So, our ancients, hungry with long wandering for new food, were the more greedy, and gave them battle. Now as these people of the highlands and cliffs were of the elder nations of men and were allied to the Ákâkâ-kwe (the Man-soul Dance-gods) themselves, these our people, ere they had done, were well nigh finished of fighting. For it was here that the Kʻyákweina Ókʻyätsiki, or Ancient Woman of the Kʻyákweina, who carried her heart in her rattle and was deathless

of wounds in the body, led the enemy, crying out shrilly; all of which, yea and more, beyond the words of a sitting, is told in other speeches of our ancient talks, those of the Kâ'kâ. Thus, it fell out ill for the fighting of our impetuous ancients; for, moreover, thunder raged and confused their warriors, rain descended and blinded them, stretching their bow-strings of sinew, and quenching the flight of their arrows as the flight of bees is quenched by the sprinkling-plume of the honey hunter. But the strong 'Hlĕetokwe devised bow-strings of yucca, and the Two Little Ones sought counsel of the Sun-father, who revealed the life-secret of the Demoness and the magic power over the under-fires (*kóline*) of the dwellers in the mountains and cliffs; so that after certain days the enemy in the mountain town were overmastered. And because our people found in that great town some survivors hidden deep in the cellars thereof, and plucked them forth as rats are pulled from a hollow cedar, and found them blackened by the fumes of their own war-magic, yet comely and wiser than the common lot of men withal, they spared them and called them the Kwínikwakwe (Black people), and received them into their kin of the Black Corn.

THE ADOPTION OF THE BLACK PEOPLE, AND THE DIVISION OF THE CLANS TO SEARCH FOR THE MIDDLE.

Now for once even the Warriors of the Bow were fully surfeited of fighting, and paused to rest. Thus, warm hands of brothers elder and younger were clasped with the vanquished; and in time (for at first these people were wild of tongue) speech was held with them, whereby our fathers gained much knowledge, even of their own powers and possessions, from these Black people, in like manner as they had gained knowledge from the People of the Dew, whence in like manner also they grew wiser in the ways of living, and loved more to cherish their corn and corn virgins that they might have life and abundance rather than cause death and hunger. Yet were their journeyings not ended. Again, and anon, the shell sounded warning.

When, therefore, the Twain Little Ones, Áhaiyuta and Mátsailema, again bade the people arise to seek the Middle, they divided them into great companies, that they might fare the better (being fewer in numbers together) as well as be the better content with thinking that, thus scattered, they would the sooner find the place they had for so long sought. So, again the Winter people were bidden to go northward, that in their strength they might overcome evils and obstacles and with their bows strung with slackless fiber of the yucca, contend, winning their way with the enemy in cold weather or warm, and in rain and dryness alike. With them, as aforetime, they carried their precious *múetone*, and with them journeyed Mátsailema and the Warriors of the Knife, they and chosen Priests of the Bow.

Also, to the southward, as before, journeyed the Seed people and the kinties of Corn and others of the Summer people, they and with them

the Black people, wise and possessed of the magic of the under-fire, having dealings also with Kâ′kâ-kwe and with the wonderful Chúa-kwe—a people like themselves, of corn, and called therefore People of Corn grains,—they and their Kâ′kâ, the K'yámak'ya-kwe, or Snail Beings of the South (those who waged war with men and *their* Kâ′kâ in after times), for these reasons they, the Summer people, led the people of Corn and Seed and these alien people.

And as before, the people of the Middle—yea, and those of the Seed and Dew who especially cherished the *chúetone* and the Maidens of Corn—sought the Middle through the midmost way, led of Áhaiyuta, the elder, and his Priests of the Bow.

THE NORTHWARD EASTERN JOURNEY OF THE WINTER CLANS.

The People of Winter, those led by the 'Hléeto-kwe, and Mátsailema, fought their way fiercely into the valley of the Snow-water river (Úk'yawane—Rio Puerco del Poniente), settling first at the mud-issuing springs of that valley (Hékwainankwin), where their villages may be seen in mounds to this day, and the marks of the rites of their fathers and of their kin-names on the rocks thereabout.

And they became far wanderers toward the north, building towns wheresoever they paused, some high among the cliffs, others in the plains. And how they reached at last the "Sacred City of the Mists Enfolded" (Shípapulima, at the Hot Springs in Colorado), the Middle of the world of Sacred Brotherhoods (Tík'yaawa Ítiwana), and were taught of Póshaiaŋk'ya ere he descended again; and how they returned also, thus building everywhere they tarried, along the River of Great Water-flowing, (Rio Grande del Norte) even back to the mountains of Zuñiland (Shíwina yálawan) and settled finally at the Place of Planting (Tâ′iya or Las Nutrias)—all this and more is told in the speeches they themselves hold of our ancient discourse.

THE SOUTHWARD EASTERN JOURNEY OF THE SUMMER CLANS.

The people of Corn and the Seeds, guided by the Kwínikwakwe, fared for long peacefully, southward along the valley of the River of Red Flowing Waters, building them towns of beauty and greatness, as may be seen to this day, and the marks of their rites also are on the rocks whithersoever they traveled. Far south they fared until they came to the great valley of Shóhkoniman (home, or place of nativity, of the Flute-canes) beneath the Mountain of Flutes (Shóhko yálana—La Sierra Escudilla), whence they turned them eastward.

How they builded thereafter, wheresoever long they remained, not single towns, but for each sept of their kinties a town by itself, and the names of these clan-towns, and the wars they fought contending with the Kâ′kâ, and how finally they reached the Mountain of Space-speaking Markings (Yála Tétsinapa), then turned them back west-

ward and sat them down at last with other people of the way, in the upper valley of Zuñiland (Shíwina Téu'hlkwaina), building Héshotatsína (The Town of Speech-markings) and many other towns, all of them round and divided into parts, ere they rejoined the people of the Middle, when that they too had come nigh over the heart of the world—all this and much else is told in the speeches they themselves hold of our ancient discourse.

THE EASTWARD MIDDLE JOURNEY OF THE PEOPLE OF THE MIDDLE.

How the People of the Middle, the Macaw people and their children, journeyed straightway eastward, led by Áhaiyuta and the fathers of all the people, this we tell in the mid-coming speech of our sacred ancient discourse, and in other speeches thereof. How, now, after time, they settled at Kwákina, where the Brotherhood of Fire (Mákekwe) had its place of ancient origin in wondrous wise—told of by themselves—and where originated their great dance drama of the Mountain Sheep, and the power of entrance into fire, and even of contention with sorcery itself.

And at each place in which the people stopped, building greatly, they learned or did some of the things for which those who be custodians of our olden customs amongst the Tík'yaápapakwe (Sacred Brotherhoods) are still marvelous in their knowledge and practice. But after our father ancients had builded in Kwákina, lo! when the world rumbled and the shells sounded, the noise thereof was not great, and therefore no longer did they arise as a whole people, for seeking yet still the Middle, but always many abode longer, some living through the dangers which followed, and becoming the fathers of "Those who dwell round about the Middle." Still, for long the warnings sounded and the leaders would be summoning the people to seek the "very midmost place wherein the tabernacle of the sacred seed-contents might be placed at rest safely for all time, and where might dwell in peace those who kept it."

THE SETTLEMENT OF ZUÑI-LAND, AND THE BUILDING OF THE SEVEN GREAT TOWNS THEREIN.

It was in this way that first after Kwákina, Háwikuh was built, and thereafter, round about Zuñi, each (at first lesser because of the people left behind each time) of all the others of the six towns of all the regions the Midmost (Shíwina 'Hlúella Úlapna).

First, then, Kwákina, then Háwikuh, K'yánawe, Hámpasawan, K'yäkime and Mátsaki. And in what manner the people dwelt in each of these, how they talked and consorted wondrously with beasts and gods alike is told in the *télapnawe* (tales of the olden time passing) of our ancients, alike in the "lies of the grandfathers" and in the "strands" of their solemn sayings. But always, at each place, were

those abiding who believed, despite the warnings, that they had found the Middle, least wise for themselves, contending the which, they continued in the place of their choice, those of the Northern (sept) in the first place, those of the West next, and so, those of the South, East, Upper and Lower regions. Whilst still the main people of the Macaw and the other Middle kinties, sought unweariedly until they thought at last that in Mátsaki they had found indeed the place of the Middle.

THE REUNION OF THE PEOPLE OF THE MIDDLE WITH THE SUMMER AND SEED PEOPLES.

Whilst in this persuasion they still tarried there, lo! again, after long wanderings through many valleys, the peoples of Corn and the Seed found them there, through seeing of their smoke, and in the near valley to the eastward found they as well the peoples of the Corn and the Seed, dwelling in their great round towns, the smoke whereof wanderers had also erstwhile been. So they said to them, "Ye are our younger brothers! At Mátsaki, here at the Middle, let us dwell in peace as one people, others of our kinds around about us, yet with us!"

Thereby Mátsaki greatly increased; but the warnings yet still sounded anon and the gods and master-priests of the people could not rest.

THE GREAT COUNCIL OF MEN AND THE BEINGS FOR THE DETERMINATION OF THE TRUE MIDDLE.

Nay, they called a great council of men and the beings, beasts, birds and insects of all kinds *'hlímna;* these were gathered in the council.

After long deliberation it was said:

"Where is K'yanäs'tïpe, the Water-skate? Lo! legs has he of great extension, six in number. Mayhap he can feel forth with them to the uttermost of all the six regions, thereby pointing out the very Middle." And K'yanäs'tïpe, being summoned, appeared in semblance, growing greater; for lo! it was the Sun-father himself (K'yanäs'tïpe through *'hlímna* being). And he answered their questions ere he was bespoken, saying, "Yea, that can I do." And he lifted himself to the zenith, and extended his finger-feet six to all of the six regions, so that they touched to the north, the great waters; and to the west, and the south, and the east, the great waters; and to the northeast, the waters above; and to the southwest, the waters below.

But to the north, his finger-foot grew cold, so he drew it in; and to the west, the waters being nearer, touched his finger-foot thither extended, so he drew that in also. But to the south and east far reached his other finger-feet. Then gradually he settled downward and called out, "Where my heart and navel rest, beneath them mark ye the spot and there build ye a town of the midmost, for there shall be the midmost place of the earth-mother, even the navel; albeit not the center, because of the nearness of cold in the north and the nearness of waters in the west." And when he descended (squatting), his belly

rested over the middle of the plain and valley of Zuñi; and when he drew in his finger-legs, lo! there were the trail-roads leading out and in like stays of a spider's net, into and forth from the place he had covered.

THE ESTABLISHMENT OF THE FATHERS AND THEIR TABERNACLE AT HÁLONAWAN OR THE ERRING-PLACE OF THE MIDDLE.

Then the fathers of the people built in that spot, and rested thereat their tabernacle of sacred treasures. But K'yanäs'tïpe had swerved in lowering, and their town was reared a little south of the very midmost place. Nevertheless, no longer in after time sounded the warnings. Hence, because of their great good fortune (*hálowilin*) in thus finding the stable middle of the world, the priest-fathers of the people called this midmost town the Abiding place of Happy Fortune (Hálonawan).

THE FLOODING OF THE TOWNS, AND THE BUILDING OF THE CITY OF SEED ON THE MOUNTAIN.

Yet, because they had erred even so little, and because the first priest of after times did evil, lo! the river to the southward ran full, and breaking from its pathway cut in twain the great town, burying houses and men in the mud of its impetuosity. Whence, those who perished not and those of the flooded towns rounded about fled to the top of the Mountain of Thunder, they with all their Seed people and things, whence the villages they built there were named Tâaiyá'hltona 'Hlúelawa, or the "Towns-all-above of-the-seed-all."

THE STAYING OF THE FLOOD BY SACRIFICE OF THE YOUTH AND MAIDEN, AND THE ESTABLISHMENT OF HÁLONA ÍTIWANA ON THE TRUE MIDDLE.

But when by the sacrifice of the youth priest and maiden priestess (as told in other speech) the waters had been made to abate and the land became good to walk upon, all the people descended, calling that high mountain place, which ever after hath echoed thunder, Tâaiyálane, or the Mountain of Thunder. When all the towns were rebuilded, then on the northern side of the river they builded anew the Town of the Middle, calling it Hálona Ítiwana (Halona the Midmost); but the desolated part they called Hálonawan, because they had erred there (*hálowak'ya*), though even so little.

THE CUSTOM OF TESTING THE MIDDLE IN THE MIDDLE TIME.

Now at last never more did the world rumble; yet the fathers of the people questioned in their hearts, fearing further misfortune to their children, if so be they still erred in the resting place of the sacred mysteries whatsoever. So, when the sun had reached the middle between winter and summer, they devised an ordinance and custom whereby this might be tested. They brought out the things of lightning and the

earthquake; even the keepers of the great navel-shell were summoned as having canny and magic skill. And as now we do in observing the custom of the Middle-arriving, all the people fasting, all the fires close kept, so then, for ten days they made ready, and on the last night the shell was laid by the sacred fire in Héin Kíwitsina of the North, and watched all the night through, by its keepers and the fathers foremost, and the Priests of the Bow. Meanwhile the incantations of dread meaning, taught of the Twain in Hánthlipiŋk'ya, were chanted, yet the world only rumbled deeply and afar down, but it trembled not, neither did the Seven Fell Ones breathe destruction—only storms. Then, said the fathers, "O, thanks! In peace-expecting mood may we kindle afresh the fires of our hearths for the year that is dawning." And they sent forth new fire to all houses, causing the old to be cast out as is seen and known to us all in the custom of this day of the Middle-arriving!

So, happily abode the people, they and their brothers round about them at the Middle, for surely now the sacred things were resting over the stable middle of the world, and were the foundations of Hálona Ítiwana or the Midmost place of Favor (or fortune).

THE CHERISHING OF THE CORN MAIDENS AND THEIR CUSTOM AS OF OḶD.

Now when thus, after long ages of wandering, the tabernacles of the precious seed-things were resting over the Middle at Zuñi (they, the fathers of the people and also the Corn tribes and their other children), then, as in the olden time, men turned their hearts rather to the cherishing of their corn and Corn maidens than to the wasting of lives in war with strange men and the Ákâkâ. Again they loved, cheerfully too, the custom of the beautiful Corn maidens, and this, year after year, they practiced that the seed of seeds might ever be renewed and its abundance be maintained.

THE MURMURING OF THE FOOLISH ANENT THE CUSTOM OF THE CORN MAIDENS.

And whereas this was well, yet, forsooth! there were not wanting those who grew weary of the custom at last, and said that it was not as in the olden time it had been. Then, said they, the fathers of the people had performed their custom, and the fathers of the people of Dew theirs, the one awaiting the other, as it were, and both joining in the sight of the people all. Others said that the music was not as that of the olden time; that better far was that which of nights they sometimes heard (oftener toward morning) as they wandered up and down the trail by the river; wonderful music this, as of liquid voices in caverns or the echo of women's laughter in water-vases. And this music, they said, was timed with a deep-toned drum, and seemed to come forth from the very bowels of the Mountain of Thunder. Lo!

they were awed thereby, and bethought that the music was, mayhap, that of the ghosts of ancient men who had dwelt above in the times of the high waters; but it was far more beautiful, at least, than the music of the 'Hláhekwe singers when danced the Corn maidens.

Others said yea, and lingering near they had seen, as the daylight increased, white clouds roll upward from the grotto in Thunder mountain like to the mists that leave behind them the dew itself, and as the sun rose, lo! within them even as they faded, the bright garments of the Rainbow-women might sometimes be seen fluttering, and the broidery and paintings of these dancers of the mists were more beautiful than the costumes of even the Maidens of Corn.

THE COUNCIL OF THE FATHERS THAT THE PERFECTION OF THE CUSTOM BE ACCOMPLISHED.

Then were the fathers of the People-priests of the House of Houses sore displeased at these murmurings of their children, and bade them to be hushed; yet they pondered, and bethought themselves how to still these foolish children yet more completely, so that the precious Mothers of Corn be not made sad by their plaints.

"What is this ye tell us?" said they. "These things be to the simple as the wind and other movings, speechless; but to us, they be signs, even as erst the warnings of the under-world were signs to our fathers the beloved, and ourselves, that we seek still further the Middle, so are these things signs to us. Stay, therefore, thy feet with patience, while we devise that ye be made content and happy." Then to one another they said, "It may well be Paíyatuma, the liquid voices his flute and the flutes of his players that they tell of. Come now, we will await the time of our custom and then learn if perchance our hearts guess aright."

THE OBSERVANCE OF THE 'HLÁHEKWE CUSTOM, OR DANCE OF THE CORN MAIDENS.

Now when the time of ripening corn was near, the fathers ordered preparation for the 'Hláhekwe, or dance of the Corn maidens.

When the days of preparing had been well nigh numbered, the old ones, even the Kâ'yemäshi themselves who had come with the Kâ'kâ (subject now to the prayerful breaths of the priest-fathers of the people) in the spring and summer times of the Kâ'k'okshi dances, came forth yet again from the west, and with fun and much noise of mouth, made—as for his sister their father had first made—a bower of cedar. But this bower they built, not in the open plain, but in the great court of the town where the dances and customs of the Kâ'kâ were held. For in these days the people and the kinties of Seed no longer came as strangers to the abode of other people, hence builded not their bower in the plain, but in the plaza of their own town. And the Kâ'yemäshi diligently collected cedar-boughs and rafter-poles

from the hills beyond the plains. With these, as they had been commanded in olden time by K'yäk'lu, they builded the great bower. They helped also the chosen men of the Badger and Water kinties to bring the hemlock trees from the southern canyon, and danced, singing gravely for the nonce, as these called forth the growth thereof in sacred smoke of the spaces, and then, as the night fell, laden with offerings from the people, and whitened with the favor of their prayer-meal, they returned whither the Kâ'kâ and the souls of men ever return, westward along the river to the mountains of the Dance of Good and the Waters of the Dead.

Then came the Sun-priest and the Priests of the House of Houses, with the tabernacles of sacred seed-substances, the *múetone*, the *k'yáetone* and the *chúetone*, and with world-terraced bowls of sacred favor (prayer-meal). These, they bore into the plaza in solemn procession, followed by the matrons of the Seed and Water clans, with the trays of new seed and their offerings of plumed wands to the spaces; and even as today, in every particular, so then the Priest of the Sun and his younger brothers of the House laid out the sacred reclining terrace and roadway of prayer, leading down from it through the middle, and duly placed the sacred things in order upon and before it. As today it is done even in the same order, so then the priests took their places at the rear of the terrace and altar of sacred things, and the matrons theirs by their trays of new seed, those of the Seed kins southwardly to the right, those of the Water kins northwardly to the left beside the reclining terrace and down the sacred roadway guided and placed, each in order, by the chosen leaders of the dance, and watched over by the Priests of the Bow.

Thus, when the singers came and sat them down in the southern side, as today, so then, the father of the people gave the word for beginning, and spake the issuing-forth rites. But then, not as now, there were singers only to the south, yea, and dancers only of them, whence the complainings of the people had been voiced.

As the darkness deepened the master-priest said, "Lo, now! as in the olden time let kindled be a fire, beyond the dancers (*ótakwe*) in front of the bower. Mayhap by its light yet other singers and dancers will come, as in the olden time came Paíyatuma and his people, for the perfection of the corn. If so be, those who murmur will be content with the completeness of our custom."

Then those whose office it was to keep the shell and fire, generated with their hands the heat thereof, and the youths round about merrily attended them with fuel, and in the brightening light the dance went on.

THE SENDING OF THE TWAIN PRIESTS OF THE BOW, THAT THEY BESPEAK THE AID OF PAÍYATUMA AND HIS FLUTE PEOPLE.

When the House of the Seven Stars had risen high in the sky, then the fathers summoned before them the two Master-priests of the Bow.

"Ye have heard," said they in low-sounding speech, "the complainings of these children and their tales of strange sights and sounds at the grotto under Thunder mountain. Go forth, therefore, and test the truth of all this. If so be ye too hear the music, approach the cavern and send greeting before ye. It were no wonder if ye behold Paíyatuma and his maidens other seven, and his singers and players of flutes. They will deem ye well arrived, and maychance will deign to throw the light of their favor upon us and give us help of their custom, thereby adding to the contentment and welfare of our children among men, and to the completeness of our own observances."

Then with their hands the Fathers of the House extended their breaths, which breathing, the Priests of the Bow went forth, one following the other.

THE FINDING OF PAÍYATUMA, AND HIS CUSTOM OF THE FLUTE.

When, up the trail of the river, they had some time passed Mátsaki, they heard the sound of a drum and strains of song now and then echoing down from Thunder mountain. Then they knew that the sounds came from the Cavern of the Rainbow, and so hastened forward; and as they neared the entrance, mists enshrouded them, and they knew now also that verily Paíyatuma was there. Then they called to know if there were gathering within. The singing ceased, and they were bidden to enter and sit. As they did so, Paíyatuma came forward to them and said:

"Ye come well. I have commanded the singers to cease and the players to draw breath from their flutes, that we might hearken to the messages ye bear, since for naught never stranger visits the place of a stranger."

"True," replied the two, "our fathers have sent us to seek and greet ye, it having been declared by our children that thy song-sounds and the customs thereof so far surpass our own, even those of our beloved Maidens, makers of the seed of seeds."

"Ah, well!" replied he, "thus ever is it with men, children, verily! Athirst ever are they for that which is not or which they have not. Yet it is well that ye come, and it shall be as ye wish. Sit ye yet longer, watch and listen."

To the left, grouped around a great world-bowl, clad in broidered cotton vestment, were a splendid band of players, long flutes in their hands and the adornments of god-priests on their faces and persons. In their midst, too, was a drummer and also a bearer of the song-staff; aged, they, and dignified with years.

Paíyatuma scattered a line of pollen on the floor, and folding his arms strode to the rear of the cavern, then turned him about and with straightened mien (*tsámo'hlanishi*), advanced again. Following him, lo, and behold! came seven maidens beauteous like to the Maidens of Corn, but taller and fainter of form. Like to them also in costume, yet

differing somewhat in the hue of the mantles they wore. And in their hands they carried, not tablets of the sun, moon, and each her star with cross symbol of the Corn priests above them, but, verily, wands of cottonwood from the branchlets and buds of which tiny clouds flowed forth.

"These be the sisters of our Maidens of Corn, of the House of the Stars, seen these too, as they, so these more faintly, as, when above are seen the stars of the House of Seven, others seven are seen below in the waters. Like in form of gesture is their dance custom, but fertile not of the seed, but of the water of life wherewith the seed is quickened," said Paíyatuma.

He lifted his flute, then took his place in the line of the dancers, as the *yä'poto* does in the line of the Corn dance. The drum sounded until the cavern shook as with thunder. The flutes sang and sighed as the wind in a wooded canyon whilst still the storm is distant. White mists floated up from the wands of the maidens and mingled with the breath of the flutes over the terraced world-bowl, above which sported the butterflies of Summerland, about the dress of the Rainbow in the strange blue light of the night.

Awed and entranced with the beauty of it were the Priests of the Bow, insomuch that when they arose to go they feared to speak their further message. But Paíyatuma, smiling, gave them his breath with his hands and said, "Go ye the way before, telling the fathers of our custom, and straightway we will follow."

THE PREPARATIONS FOR THE COMING OF PAIYATUMA AND HIS PEOPLE OF THE FLUTE.

Then silently the Priests of the Bow returned as they had come, and entering the dance-court and bower, bowed low and breathed over the hands of the fathers and by them being breathed and smoked in turn, old of what they had seen and listened to in the Cave of the Rainbow. But the watchers had grown weary, and only the fathers heard and understood. While the people nodded their heads all drowsily, some sleeping, the leaders arose as their father ancients had arisen on that night of the birth of Corn in the olden time, and carried the sacred gourds aside and placed them around a great world-bowl wherein was water, and over them in secret (as in the olden time those fathers-ancients had done with the prayer-wands and grass seeds, so now) they performed rites, and said mystic prayer-words. And in the bowl they put dew of honey and sacred honey-dust of corn-pollen, and the ancient stones—ancient of water whence water increases. Then, to the left and northward side they placed the bowl and with it a great drum jar, and spread blankets as for singers other than those already sitting on the southern side.

After that they sat them down again, and then the Priests of the Bow signed their guardian younger brothers to bestir the people assembled

that they might sit the more seemly for the coming, mayhap, of precious strangers.

THE COMING OF PAÍYATUMA AND HIS DANCE OF THE FLUTE.

Ere long, the sound of music was heard, coming from up the river, and soon came Paíyatuma followed by his Flute people and singers and maidens of the Flute dance. Uprose the fathers and all the watching people, greeting the God of Dawn with outstretched hands and offerings of prayer-meal, and words of thanks and welcome. Then the singers took their places and sounded their drum, flutes, and song of clear waters, while the Maidens of the Dew danced their custom of the Flute dance. Greatly marveled the people when from the wands they bore forth came white clouds, and fine cool mists descended.

THE SACRILEGE OF THE YOUTHS OF THE DANCE, AND THE FLEETING OF THE MAIDENS OF CORN.

Now when the dance was ended and the Dew maidens, with Paíyatuma, had retired within the bower, forth came the beautiful and ever young Mothers of Corn. And when the players of the flutes saw them, they were enamored of their beauty, and gazed upon them so intently that fain were the maidens to let fall their hair and cast down their eyes. Yet the youths grew not less bold of eye. Then, yea and with jealousy now, bolder grew the youths mortal, who led the dance and attended the dancers, and lo! as the morning neared and the dancers of the flute came forth again, these, impassioned and in rivalry, sought all too freely the presence of the Mother-maidens, no longer holding them so precious as in olden time, but e'en plucking at their white garments.

Meanwhile the people, eagerly watching the new dance, gave little heed to aught else. For behold! the waters rose in the terraced bowl and flowed out toward the dancers, yea, and the mists increased greatly, shrouding the watchers and the dancers alike, until within them the Maidens of Corn, all white their garments, became invisible! Then sadly and noiselessly they stole in amongst the people and laid their corn-wands down amongst the trays, and passing the seed-corn over their persons, placed it back in the trays, and laid their white broidered garments thereupon as mothers lay soft kilting over their babes. Behold! having thus by their wonderful knowledge now placed within the corn the substance of their flesh, then even as the mists became they, and with the mists drifting, fled away, verily, to the far south Summerland!

As the day dawned the dancers of the flutes completed their custom, the players, waving their flutes over the people assembled, followed Paíyatuma as he strode, wordless, forth from the midst of the people.

THE MOURNING FOR LOSS OF THE MAIDENS OF CORN.

The call was voiced, and the song of the Maidens of Corn sounded as when the others had retired before; the drum was beaten and the rattles

were shaken—but all in vain. No maidens came forth from the bower. Then eagerly the leaders sought all through the bower. Naught found they save the precious wands and the garments all softly laid thereupon, of their beloved Maidens of the Seed. Deep was their grief and all silent were the people. Then spake the fathers: "Look ye now; ye have watched ill, ye matrons and elders, and therein grievously have ye sinned, wherefore lost be our beloved maidens, mothers of the Seed of Seed, for some amongst our children have dared to hold them less than precious, and look upon them as upon maidens of the people they look! Wherefore arise, and brush away from thy persons and spit forth from thy mouths the evil of this night, that the day find ye not shame-darkened, and further ill befall ye not than the grievous loss of our beautiful maidens; for the rash forwardness of our youths, and the negligence ye have proven guilty of in failing to watch all things well are sore, and are punished full meetly as was warned us aforetime by this our grievous loss!"

Then said they to one another, "We must seek (but how?) the maidens; and we must summon them forth from their hiding with solemn promise, if only that we may look upon them once more and see that they go forth at least content with those who have not wrought this evil, and content with us, not wroth; and that they be not thus wroth or sad hearted, and therefore withhold not from us their sacred breaths of blessing, lacking which the corn seed, life of flesh, can not flourish. But who shall seek them for us? They left no trail behind and far must have instant journeyed, being now of other-being—as may be seen by their cast-off garments, left here with us. O, woe! woe the day when we heeded not well their preciousness! If woe to us, woe indeed to our murmuring children who know not what they want, and lightly consider too many of the things they have, therein lightly holding them!"

THE SEEKING OF THE MAIDENS OF CORN BY THE EAGLE.

Again, therefore, called they forth the two master-priests, and said: "Who, now, think ye, should journey to seek our precious maidens? Bethink ye, strong of will, who amongst the beings is even as ye are, strong of will and good of eyes?

"There is our great elder brother and father, the Eagle, he of the side floating down (*sulahaiyan látane*) and the terraced tail-fan (*áwi'hluiyan k'yátine*); surely he is enduring of will and surpassing of sight."

"Yea, most surely," said the fathers. "Go ye forth and beseech him."

Then northward fared the twain swiftly to Twin mountain, where dwelt with his mate and his young, in a grotto high up among the crags, the Eagle of the White Bonnet.

And when they climbed the mountain and spake in at the entrance of the grotto, behold! only the eaglets were there, who, frightened,

screamed lustily, striving to hide themselves in the dark recesses to the rearward, "O, pull not our feathers, ye of hurtful touch, but wait, when we are older we will drop them e'en from the clouds for you!"

"Hush!" said the warriors, "wait ye in peace, for we seek not ye but thy father!"

But from afar came at once, a frown on his brow, the old Eagle. "Why disturb ye my pin-featherlings?" cried he.

"Behold, father and elder brother, we come seeking only the light of thy favor. Listen!"

Then they told him of the lost Corn maidens, and prayed him to seek them, that messages of conciliation might be sent them or given.

"Being so, be it well with thy wishes. Go ye before contentedly," answered the Eagle, smoothing his feathers.

Forthwith the warriors returned to the council of the fathers, relating how that their message had been well received, and the eagle leapt forth and winged his way high into the sky—high, high, until he circled among the clouds, small seeming and swift, as seed-down in a whirlwind. And all through the heights he circled and sailed, to the north, the west, the south and the east. Yet nowhere saw he trace of the Maidens. Then he flew lower, returning, and the people heard the roar of his wings almost ere the warriors were rested, and arose eagerly to receive his tidings. As he alighted, the fathers said, "Enter thou and sit, oh brother, and say to us what thou hast to say;" and they offered him the cigarette of the space-relations.

When they had puffed to the regions and purified his breath with smoke, and blown smoke over the sacred things, then the Eagle spake: "Far have I journeyed, scanning all the regions. Neither blue bird nor wood-rat can hide from my seeing," said he, snapping his beak and looking aslant. "Neither of them, unless they hide under bushes; yet have I failed to see aught of the maidens ye seek for. Send you, therefore, for my younger brother the Falcon; strong of flight is he, yet not so potently strong as I, and nearer the ground he takes his way ere sunrise.

Then the Eagle, scarce awaiting the thanks of the fathers, spread his wings and flew away to Twin mountain, and the Warrior Priests of the Bow, sought again fleetly over the plain to the westward for his younger brother, the Falcon.

THE SEEKING OF THE MAIDENS OF CORN BY THE FALCON.

They found him sitting on an ant hill; nor would he have paused but for their cries of peaceful import, for, said he, as they approached him, "If ye have snare-strings I will be off like the flight of an arrow well plumed of our feathers!"

"Nay, now!" said the twain. "Thy elder brother hath bidden us seek thee." Thereupon they told him what had passed, and how that the Eagle had failed to find their maidens so white and beautiful.

"Failed, say ye? Of course he failed! For he clambers aloft to the clouds and thinks, forsooth, that he can see under every bush and into every shadow, as sees the Sun-father who sees not with eyes! Go ye before," said the Falcon; and ere they had turned toward the town, he had spread his sharp wings and was skimming off over the tops of the trees and bushes as though verily seeking for field mice or birds' nests. And the warriors returned to tell the fathers and await his coming; but after he had sought far over the world to the north and the west, the east and the south, he too returned and was received as had been the Eagle; but when he had settled on the edge of a tray, before the altar, as on the ant hills he settles today, and had smoked and been smoked as had been the Eagle, he told the sorrowing fathers and mothers that he had looked behind every copse and cliff-shadow, but of the maidens had found no trace. "They are hidden more closely than ever sparrow hid," said he, gripping the cover of the tray on which he perched as though it were real feathers and blood, and ruffling his crest. Then he, too, flew away to his hills in the west.

"Alas! alas! our beautiful maiden mothers!" cried the matrons. "Lost, lost as the dead are they!" "Yea," said others, "where, how indeed, shall we seek them now? For the far-seeing Eagle and the close-searching Falcon alike have failed to find them."

THE SEEKING OF THE MAIDENS OF CORN BY THE RAVEN.

"Stay your feet with patience," said the fathers. For some amongst them heard a Raven who was wandering about the edge of the town at break of day seeking food in the dirt and refuse, and they bethought themselves. "Look, now! There is Heavy-nose, whose beak never fails to find the substance of seed itself, however so little or well hidden it be. Surely he well must know then, of the maiden-mothers thereof. Let us call him." So they bade the warrior-priests go forth once more. Forth to the river side went the priests. "We carry no pricking quills," said they, raising their hands all weaponless, "and, O, Black-banded father, we seek your aid; for look now, the mother-maidens of seed whose substance is the food alike of thy people and our people, have fled away whither neither our grandfather the Eagle, nor yet his younger brother the Falcon, can trace them; and we pray thee to aid us or give us counsel of guidance."

"*Ka! ka!*" cried the Raven. "Nay, now; much too hungry am I to go abroad fasting on business for ye and thy kind. Ye are stingy! Here have I been since ever perching time, striving to win a throatful, but ye pick thy bones and lick thy bowls too clean for the like of that, be sure!"

"But come in then, thou poor grandfather. Surely we will give thee food to eat; yea, and a cigarette to smoke with all due observance!"

"Say ye so?" said the Raven, ruffling his collar and opening his mouth so wide with a lusty *kwa-la-ka*, that well he might have swallowed his

own head. "Go ye before, then," said he, and he followed them closely into the court of dancers.

Not ill to look upon was he, for upon his shoulders were bands of cotton, white, and his back was blue and gleaming as the tresses of a maiden dancer in sunlight. When the warriors had spoken to the fathers, the master priest of them, rising, came forward and greeted the Raven, bidding him sit and smoke.

"Ha! there is corn in this, else why the stalk thereof?" said the Raven as, taking the cane cigarette of the far-spaces, he noticed the joint thereof. Therefore, forthwith, as he had seen the master do, so did he, only more greedily. He sucked in such a throatful of the smoke, fire and all, that it well nigh strangled him, and he coughed and grew giddy and sick to such a pass that the smoke, all hot and stinging, went through every part of him, and filled all his feathers, making even his brown eyes bluer and blacker in rings! It is not to be wondered at, this blueness of flesh, blackness of dress and tearfulness, yea and skinniness, of eye which we see in his kindred today. Nay, nor is it matter of wonder, either, that for all that, they are as greedy of corn-food as ever, for look now—no sooner had the old Raven recovered than he espied one of the ears of corn half hidden under the mantle-covers of the trays. He leapt from his sitting place laughing (as they always do when they find anything, these ravens), then catching up the ear of corn, he made off with it over the heads of the people and the tops of the houses, saying, "Ha! ha! in this wise and in no other meseems will ye find thy Seed maidens!"

Nevertheless, after some absence, he came back, saying, "A sharp eye have I for the flesh of the maidens, but of their breathing-beings, who might see them, ye dolts, save by help of the Father of Dawn Mist himself, whose breath makes others of breath seen as itself;" whereupon he flew away again kawkling.

THE BESEECHING OF PAÍYATUMA, AND HIS REVERSAL OF THE PEOPLE'S EVIL.

"Truly now, truly," said the elders to one another; "but how shall we find, and how prevail on our father Paíyatuma to aid us, when so grievous is ours the fault? Which same, moreover, he warned us of in the old time."

Of a sudden, for the sun was rising, they heard Paíyatuma in his daylight mood and *'hlímnan*. Thoughtless and loud, uncouth of mouth, was he, as he took his way along the outskirts of the village. Joking was he, as today joke fearlessly of the fearful, his children the Néwekwe, for all his words and deeds were reversals (*íyati'hlna pénawe*) of themselves and of his sacred being. Thus, when quickly the warrior priests were sped to meet him, and had given to him their greetings and messages, he sat him down on a heap of vile refuse, saying that he was about to make festival thereof, and could in no wise be

disturbed. "Why come ye not?" said he, "cowards and followers of the people?"

"Nay, but we are Priests of the Bow, the twain who lead them, father, and we do come."

"Nay, but ye do not come!"

"Yea, verily we do come, and to seek thy favor, asking that ye accompany us to the council of the elders," said the two priests.

"Still I say ye nay, and that ye are children, all; and that if ye did come, ye could not summon me, and that if ye did summon me, go would I not, forsooth, to a council of little children; nay, not I!" said he, rising and preparing forthwith to follow them, as it were, but immediately taking the lead, and striding rudely into the presence of the fathers whom he greeted noisily and with laughter like one distraught, and without dignity or shame.

"My poor little children," said he to the aged priests and the white haired matrons, "good the night to ye all" (albeit in full dawning); "ye fare happily, I see, which perplexes me with sorrow."

"Comest thou, father?" said the chief priest; "pity thou our shame and sorrow."

"Father yourself; nay, not I!"

"Father," said the chief priest once more, "verily we are guilty, but lo! yet the more sad from much seeking in vain for our maidens the mothers of seed; and we have summoned thee to beseech the light of thy wisdom and favor, earnestly, O, father, notwithstanding our fault which thou thyself warned us in olden time to beware, yet do we beseech thee!"

"Ha! how good that I find ye so happy, guileless, arrogant and so little needing of my counsel and helping."

"But we beseech the light of thy favor, O, father, and aid in the finding of our beautiful maidens."

"Oh that is all, is it? But why find that which is not lost, or summon those who will not come? Even if they were lost and would come, look now! I would not go to seek them. And if I went to seek them I could not find them, and if I found them and called them they would not hearken and follow, and even if they would I should bid them bide in Summerland if they were there, and tell them ye cared naught for their presence, having too preciously cherished them."

"Lo, now!" said he, looking down and at the fathers; "I see that thine old ones, those whom ye follow, are all wise, while ye have been foolish and negligent, not preparing sacredly the plumes of the spaces, nor setting them in order before the uplifted terrace, nor yet here behind the winding lines of the seed trays and the walkers by them," said he as he stooped to pluck up the very plumes he had said were not there and withal in front of the reclining terrace and the straight rows of patient sitters. One—the yellow, that of the north—he took, and breathed thereon. "Evil, all evil and ill made," quoth he, shaking his

head over its sacred completeness and beauty. Then he took up another, that of the west, then the red of the south and the white of the east. And gathering them in his arms he said, turning to go, "Now verily we approach."

As he thus turned to go, Pékwina the master, Speaker of the Sun, who, all wise, well knew the meaning of these lying speeches, arose, and taking two plumes, the banded wing-tip feathers of the turkey, the right and the left, shifted them as he advanced toward Paíyatuma, taking the left one in his right hand and the right one in his left hand. And nearing Paíyatuma he stroked him with the tips of the feathers, upward, breathing from them each time. Four times he stroked him, and then laid the feathers on his lips. And Paíyatuma spat upon them and breathed upon them, and all the people spat by his sign of command, uprising. Then the master-priest took the right feather in his right hand and the left feather in his left, and casting abroad the lying spittle, himself spat lightly and blew upon the feathers, and with them stroked the lips, then the person, of Paíyatuma, this time downward, breathing upon them. And this he did four times, and the face of Paíyatuma grew grave, and he lifted himself upward; and when he had so uplifted himself, lo! he was aged and grand and straight, as is a tall tree shorn by lightnings. Then placing the plume wands in the hands of the father, he took the banded plumes from him and breathed in from them, and out on the hands of the father, and folding his arms held upright in each hand the feather pertaining thereto. Then he spake:

"Thanks this day, thou father of the people. Thou art wise of thought and good of heart, divining that my evil of speech and act were but the assumption of the evils in thy children who, had they not turned false to good and fickle of their duties commanded, had else been followers of thee as are the fawns unerringly followers of the deer in the mountains and plains; and whose falsity, therefore lyingly, as it were, I did take unto myself and spit forth that they might be turned unto thee yet again and set straight in the paths of right commandment. From out of me, haply, thou hast now withdrawn the breath of reversal, and from out of me the speech of lying, even as thy children have spat forth, by my will and example, their wronging of commandments.

"Thanks this day; and therefore, in that ye, O, ye fathers, have kept thine hearts steadfastly right and straight of inclination, therefore will we show unto ye the light of our favor.

"Verily I will summon from Summerland, for there methinks thêy bide, once more the beautiful maidens, that ye look once more upon them and make offering in plumes of sacrifice meet for them, and that they consummate the seedfulness of the seed of seeds, presenting them all perfected, to ye; for lost are they as dwellers amongst ye, even as I warned ye aforetime they would be, if not held precious of person.

"Disperse, therefore, from this thy custom when ye shall have completed as is due and meet the song-lines and sacred speeches, and the

making ready thereby of the offerings of sacred plume-wands (*télikinawe*) and sacred water (*k'yáline*). Choose then, four youths, so young that they have neither known nor sinned aught of the flesh, and being of the Seed and Water kinties are meet to bear to the Shrine of the Middle, called Hépatinane, these offerings of good meaning and influence to the Earth-mother, the Maidens of Corn, and the Beloved of the Ancient Spaces. Them four ye shall accompany, ye fathers of the people, they in thy midst, bearing the things precious, the elder Master-priest of the Bow leading, and the other following, the elder before, the younger behind. Ye shall walk about the shrine four times, once for each region and the breath and season thereof, and set within the shrine and round about it with perfect speech and in order, as ye would regulate the plantings of grains, these signs of thine hearts and of the custom ye cherish. Rest ye contentedly thereafter until, with the final moon's full growing, ye await our return-coming. Ye and the others, fathers of this custom of the seed, shall then await us as for far-coming runners bearing messages of import, wait ye thus in the sacred gathering place of the north, which is the first, and which ye call Héin Kíwitsinan. There shall ye bide our coming in good and perfect council, that ye receive perfectly the perfected seed of seeds."

Again the father bent low, and Paíyatuma breathed upon him, and saying "Thus much it is finished ere I depart," turned him about and sped away so fleetly that none saw him when they went forth to see.

THE SEEKING OF THE MAIDENS OF CORN BY PAÍYATUMA.

Beyond the first valley of the high plain to the southward, he set the four plume-wands in this wise: First, the yellow, he planted upright, and over it leaned, looking at it intently. And when it had ceased to flutter, lo! the eagle down on it leaned northward, but moved not. Then he thus set the blue wand and watched it, and the white wand; but the eagle down on them leaned to right and left and still northward, yet moved not thereafter.

Then farther on he planted the red wand, and breathing not, long watched it closely, bending low. Soon the soft down-plumes began to wave as though blown by the breath of some small creature; backward and forward, northward and southward they swayed, as if in time to the breath of one resting.

"Ha! 'tis the breath of my maidens in Summerland!" quoth Paíyatuma, "for the plume of the southland sways, soft though, to their gentle breathing. Lo! thus it is and thus shall it ever be when I set the down of my mists on the plains, and scatter my bright beads in the northland; summer shall go thither from afar, borne on the breaths of the Seed maidens, and where they breathe, warmth, health, showers and fertility shall follow with the birds of Summerland and the butterflies, northward over the world." This he said as he uprose and sped, by the magic of his knowledge how, all swiftly, far southward

into the countries of Summerland; yea, swiftly and all silently as the soft breath he sought for, bearing his painted flute before him. And when he paused as though to rest, he played on his painted flute, and quickly butterflies and birds sought the dew of his breathings therefrom.

Them he sent forth to seek the Maidens, following swiftly, and long ere he found them he greeted them with the music of his song-sound, as the People of Seed now greet them in the song of their dances.

THE FINDING OF THE MAIDENS OF CORN IN SUMMERLAND.

And when the Maidens heard his music and saw his tall form advancing through their great fields of ready quickened corn, they plucked ears thereof, each of her kind, and with them filled their colored trays and over all spread broidered mantles—broidered in all bright colors and with the creature-signs of Summerland. From eldest to youngest they sallied forth to meet and to welcome him, still in their great fields of corn! Then he greeted them, each with the touch of his hands and the breath of his flute, and bade them prepare to follow him erewhile to the northland home of their deserted children.

THE RETURN OF THE MAIDENS OF CORN WITH PAÍYATUMA.

Lo! when the time had come, by the magic of their knowledge how, they lightened themselves of all weariableness or lingerfulness, and in their foster-father's lead, his swift lead, sped back as the stars speed over the world at night time toward the home of our ancients. Yet at night and dawn only journeyed they, as the dead do and the stars also. Thus journeying and resting by the way, that the appointed days might be numbered, they came at evening in the full of the last moon to the place of the Middle, bearing as at first their trays of seed, each her own kind.

THE PRESENTATION OF THE PERFECTED SEED TO THE FATHERS OF MEN. AND THE PASSING OF THE MAIDENS OF SEED.

No longer a clown speaking and doing reversals of meanings—as do his children (followers) the Néwekwe, today,—was Paíyatuma, as he walked into the court of the dancers ere the dusk of the evening, and stood with folded arms at the foot of the bow-fringed ladder of priestly council, he and his attendant follower (*ánsetone*) Shútsuk'ya, brother of Kwélele! Nay, he was tall and beautiful, and banded with his own mists, and as wings carried upright in his hands, under his folded arms, banded also, the wing-plumes right and left, of the turkey, wherewithal he had winged his way from afar leading the Maidens and followed as by his own shadow, by the black being of corn-soot, who cries with the voice of the frost-wind when the corn has grown aged and the harvest is taken away—Shútsuk'ya.

And again, surpassingly beautiful were the Maidens clothed in the white cotton and broidered garments of Summerland, even as far

walkers have said are appareled our lost others! And each in her place stood the Maidens.

Shrill now whistled Shútsuk'ya, so that all the people around, onlooking, started and shuddered. Then upward from the place of gathering came the chief priest, bearing a vessel of sacred meal—for below were gathered within, waiting (all the night and day) the fathers of the people and those of the Seed and Water and the keepers of the sacred things, praying and chanting—and when he saw Paíyatuma, him he welcomed, scattering the sacred meal which contains the substance of the life not of daylight, down the ladder-rungs, and thence leading from the sky-hole along the four sides of the roof terrace of the Kíwitsinan leftwardly, and then rightwardly into the entrance place of the descending ladder where stood high its bow-fringed standards. And as the priest retired down the descending ladder, Paíyatuma stepped easily forward and up the sanctified road-way on the ascending ladder (thus, of sacred substance made for him), followed by Shútsuk'ya, him only. Then walking to the line-mark of each region, prayed he, standing straight, consecrating it; and when each consecration was uttered, Shútsuk'ya touched him with his wands and shrilly whistled once.

Then when the words were all said, Shútsuk'ya shrilly whistled again, four times, each time touching Paíyatuma with the wands four times as he turned him about, and then signed him to come forward to the outer ascending ladder below the which waited the Maidens watching.

Then Paíyatuma reached down, and the Maiden-mother of the North, who was first, advanced to the foot of the ladder and lifted from off her head the beautiful tray of yellow corn, and this, Paíyatuma taking, presented to the regions, each in succession, praying the while, at the mark of each on the sacred line, and being signaled unto, each time, by the four-times repeated whistle of Shútsuk'ya. Thus, the Priest of the North, made aware when the number of presentations was fully accomplished, came upward and received from the hands of Paíyatuma the tray of most sacred seed and breathed deeply therefrom, saying thanks and bearing it below.

Now was the Maiden of the North, by retiring to the end of the line of her sisters, to the south stationed; and the Maiden of the West was thus become first, and she advanced as her elder sister had, when Paíyatuma turned forward, and gave up her tray of the blue corn which thus also as before, when the presentations were fully accomplished, the Master-priest of the West received, and breathed from deeply and for it said thanks, and bore it below; and so, each in turn, the Maidens gave up their trays of precious seed; the Maiden of the South, the red, which the Master-priest of the South received; the Maiden of the East, the white, which the Master-priest of the East received; and so, the tray many-colored and the tray black, and last, yet first at last, the tray

of all-color seed, which the Priestess of Seed and All, herself received. And now, behold! the Maidens stood as before, she of the North at the northern end, but with her face southward far looking, she of the West next, and lo! the seventh, last, southward, and standing thus, the darkness of the night fell around them; and as shadows in deep night, so these Maidens of the Seed of Corn, the beloved and beautiful, were seen no more of men.

THE INSTRUCTIONS OF PAÍYATUMA FOR THE ORDINANCES AND CUSTOMS OF THE CORN PERFECTING.

And Paíyatuma stood alone, at last, for Shútsuk'ya walked now behind the Maidens, whistling shrilly (as the frost-wind whistles when the corn is gathered away) among the lone canes and dry leaves of a gleaned field. And Paíyatuma descended the ladder, and stood in the fire-light with folded arms, in the midst of the fathers. And he spake unto them:

"Behold! with my lost Maidens, mothers to ye, I have returned; and finding ye gathered in good and perfect council according to my commandments and the approval of thy wisdom, I have restored unto ye with mine own hands, that which they else could not have given ye, the flesh of each made perfect in generative seed. This ye shall cherish, apart in kind, for all time, as the seed of all thy seed, and in so far as ye cherish it, verily it shall be multiplied!

"As ye have done in the days now measured, so also ye shall do in the days to come; ye shall keep the beautiful custom of the Mother-maidens of Corn, all in due season, preparing therefor strenuously. Dance in it, shall thy maidens, chosen of the Seed kinties; thus, as it were, ye shall again see the beautiful Mothers of Seed and as it were also, they shall renew the seed of each season, and therein shall ye gain in them again the preciousness of the Mother-maidens, yet lose them even thus gained, each year; choosing, therefore, each season newly, the Maidens of the Seed, that these who be lost as maidens be replaced as maidens in the replacing of the Mother-maidens.

"And ye shall keep, after each custom of the Corn Maidens, the flute custom of the Water Maidens, and after, in due season, the custom of this day also, the which I have shown unto ye. Having danced first with thy maidens of the Seed kin for the ripening of the corn, ye shall next dance with thy maidens and youth of the Water kin for the fertilizing of the seed, and after, in the full of the last moon thy Maidens of Corn shall bring the seed unto ye of the house, as ye have seen, that it be perfected; and they shall lead others maidens of other kins—not seven, but many times seven in number—who shall bring seed and the food thereof (for multiplied many times seven shall be the seed!) unto ye and thy younger brothers, that the seed be finished as the substance of flesh. Amongst my followers, also, some shall represent me and my attendant Shútsuk'ya *'hlímna* of us; and they shall choose

maidens of the Water kin *'hlímna* of the Flute maidens for the flute custom, and after, shall lead Maidens of the Seed *'hlímna* of the Mother-maidens, as we have this day led the Mother-maidens themselves unto thy presence; and as I have this day elevated, offered to the spaces and given ye from them, the seed, each kind, so shall they, in after time, give ye the seed, that ye sanctify it, ye and the good Kâ'kâ, for the people and the plantings of the spring time to come.

"For look ye, and hearken! Ye loved the custom of the Maidens, whence verily ye had life; yet amongst ye some held not preciously their persons, hence them ye shall see no more save in the persons of thine own maidens *'hlímna* of them, or in dreams or visions like thereto. For, lo! they have departed, since the children of men would seek to change the sustaining blessedness of their flesh into suffering humanity which sustains not but is sustained, and they would perish—even as the maidenhood of thy daughters must perish—and in the loving of men and the cherishing of men's children, lo! they, even they, would forget the cherishing of their beautiful seed-growing!

"Lo! as a mother of her own being and blood gives life and sustenance to her offspring, so have these given unto ye—for ye are their children—the means of life and sustenance. The Mother-maidens are gone, but lo! the seed of each is with ye! From the beginning of the newly come sun each year, ye shall treasure their gifts throughout the Moon Nameless, the Moon of the Sacred Fire and the Earth-whitening, the Moon of the Snow-broken Boughs, the Moon of the Snowless Pathways, the Moon of the Greater Sand-driving Storms, and the Moon of the Lesser Sand-driving Storms, shall ye treasure these gifts, with them, making perfect, by means of sacred observances of thy rites and the rites of the Kâ'kâ, the Seed of Seeds. Then in the new soil which the winter winds, hail, snow and water have brought unto ye the possessors of the *múetone*, ye shall bury in perfect order as I instruct ye, these gifts, their flesh, as ye bury the flesh of the dead. And as the flesh of the finished dead decays, so shall this flesh decay; but as from the flesh of the finished dead, the other-being (soul) in the night light of the Kâ'kâ springs forth, so from this flesh shall spring forth in the day light of the Sun-father, new being, like to the first, yet in sevenfold amplitude.

Of this food shall ye ever eat and be bereft of hunger. Behold! beautiful and perfect were the Maidens, and as this their flesh, derived from them in beauty and by beautiful custom is perfect and beautiful, so shall it confer on those nourished of it, perfection of person, and beauty, like to that of those from whom it was derived, so long as like them their customs are those of Maidens."

THE FINAL INSTRUCTIONS OF PAÍYATUMA, AND HIS PASSING.

"And now will I teach ye the customs and song of the planting," said Paíyatuma; and then first he sat him down and smoked the cigarette

of relationship with the fathers of the Seed and Water kinties, and all night long until the dawn the songs sounded and the sacred instructions of the seed (*tâ'a téusu haítosh nawe*) sounded.

And in the gray mists of the morning Paíyatuma was hidden—and is seen no more of men.

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